



VOLKS CITY
BEECH AVENUE
CATTEDOWN
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Trouble code	Fault location	Probable cause
00532	SRS control module - supply voltage	Battery, alternator, wiring, SRS control module
00588	Driver's airbag	Wiring, spiral cable, driver's airbag, SRS control module
00589	Front passenger's airbag	Wiring, passenger's airbag, SRS control module
00590	Front passenger's airbag	Wiring, passenger's airbag, SRS control module
00591	Front seat belt buckle switch, driver's side	Wiring, seat belt buckle switch
00592	Front seat belt buckle switch, passenger's side	Wiring, seat belt buckle switch
00594	Airbag igniter circuit	Wiring, spiral cable, airbag, SRS control module
00595	SRS control module - crash data stored	Frontal/side collision
00654	Front seat belt pretensioner, driver's side	Wiring, pretensioner defective/deployed, SRS control module
00655	Front seat belt pretensioner, passenger's side	Wiring, pretensioner defective/deployed, SRS control module
00656	Front seat pressure sensor, passenger's side	Wiring, wiring/diode connected with reverse polarity, seat pressure sensor, SRS control module
01025	SRS warning lamp	Warning lamp, wiring, instrument panel, SRS control module
01044	SRS control module - coding	Incorrectly coded
01211	Rear pretensioner, driver's side	Wiring, pretensioner defective/deployed, SRS control module
01212	Rear pretensioner, passenger's side	Wiring, pretensioner defective/deployed, SRS control module
01213	Rear pretensioner, centre	Wiring, pretensioner defective/deployed, SRS control module
01215	Rear seat pressure sensor, driver's side	Wiring, wiring/diode connected with reverse polarity, seat pressure sensor, SRS control module
01216	Rear seat pressure sensor, passenger's side	Wiring, wiring/diode connected with reverse polarity, seat pressure sensor, SRS control module
01217	Front side airbag, driver's side	Wiring, side airbag, SRS control module
01218	Front side airbag, passenger's side	Wiring, side airbag, SRS control module
01219	Rear side airbag, driver's side	Wiring, side airbag, SRS control module
01220	Rear side airbag, passenger's side	Wiring, side airbag, SRS control module
01221	Side crash sensor, driver's side	Wiring, side crash sensor, SRS control module
01222	Side crash sensor, passenger's side	Wiring, side crash sensor, SRS control module
01223	Central locking - unlock signal	SRS control module
01228	Front passenger's airbag - deactivation switch	Wiring, deactivation switch, SRS control module
01280	Front passenger's airbag deactivated	SRS control module programming
01578	Front passenger's airbag deactivation warning lamp	Wiring, warning lamp, SRS control module
01588	Inflatable curtain, driver's side	Wiring, inflatable curtain, SRS control module
01589	Inflatable curtain, passenger's side	Wiring, inflatable curtain, SRS control module

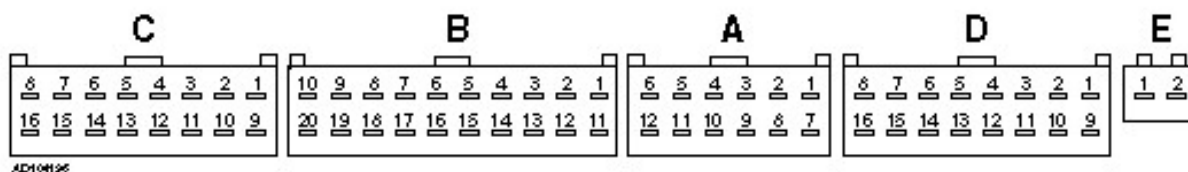
65535	SRS control module	SRS control module defective
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Y176	AC compressor variable displacement solenoid
A63	AC control module
B53	AC evaporator temperature sensor
B159	AC fascia vent temperature sensor
B160	AC footwell vent temperature sensor
B161	AC refrigerant pressure sensor
B102	AC sunlight sensor
B163	AC/heater air intake temperature sensor
M114	AC/heater air mix flap motor
A176	AC/heater blower control module
M7	AC/heater blower motor
M113	AC/heater defrost flap motor
M116	AC/heater fascia flap motor, centre
S292	AC/heater function control panel
M105	AC/heater recirculation flap motor
G1	Alternator
31	Battery -
30	Battery +
CAN-H	Controller area network (data bus) high
CAN-L	Controller area network (data bus) low
X1	Data link connector (DLC)
A130	Diagnostic module
A35	Engine control module (ECM)
M6	Engine coolant blower motor
A95	Engine coolant blower motor control module
S24	Engine coolant blower motor temperature switch
B24	Engine coolant temperature (ECT) sensor
F	Fuse
X28-I	Fuse box/relay plate, fascia
R2	Heated rear window
K76	Ignition auxiliary circuits relay
S1	Ignition switch
15	Ignition switch - ignition ON
B37	In-car temperature sensor
M51	In-car temperature sensor blower
A5	Instrument panel
A75	Instrumentation control module
B61	Outside air temperature sensor
VAN-H	Vehicle area network (data bus) high
VAN-L	Vehicle area network (data bus) low
K8	Windscreen wash/wipe intermittent relay
M2	Windscreen wiper motor



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bl = blue	br = brown	el = cream	ge = yellow
gn = green	gr = grey	nf = neutral	og = orange
rs = pink	rt = red	sw = black	vi = violet
ws = white	hbl = light blue	hgn = light green	rbr = maroon
x = braided cable	y = high tension	z = non-cable connection	

NOTE: In certain diagrams (Citroen, Peugeot & Renault), colour codes are replaced by numbers which are used to identify a particular cable and not the colour. In this instance, the cables will be numbered at each end close to the harness connector.



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System description

- Driver's and front passenger's airbags fitted as standard.
- Front side airbags fitted as standard with optional inflatable curtains.
- Airbag locations identified by the inscription 'Airbag'.
- Side crash sensors mounted separately.
- SRS control module mounted separately.
- Pyrotechnic pretensioners fitted as standard on front seat belts.
- Optional front passenger's airbag deactivation switch with additional warning lamp.

Special attention

- To prevent personal injury, expansion area of all airbags **MUST** remain clear.
- Steering wheel spiral cable has limited rotary movement.
- Centralise steering before disconnecting steering column. To prevent damage, ensure steering wheel and spiral cable **DO NOT** rotate before or during reassembly.
- Front passenger's airbag can be deactivated using diagnostic equipment.
- With deactivation switch: Front passenger's airbag can also be deactivated using ignition key, which illuminates additional warning lamp.
- Deactivation warning lamp remains illuminated if front passenger's airbag switched OFF.
- Manufacturer recommends airbag replacement every 14 years. For information on airbag replacement history refer to service handbook.
- Pyrotechnic pretensioners are electrically triggered by SRS control module.
- Front passenger's airbag has 2 multi-plugs. Disconnect in-line multi-plug. **DO NOT** disconnect red multi-plug which is directly connected to front passenger's airbag.

SRS warning lamps

System warning lamp

- Switch ignition ON.
- SRS warning lamp illuminates.
- Lamp extinguishes after approximately 4 seconds.
- If not: Refer to Self-diagnosis section.
- If warning lamp then flashes for 12-15 seconds, front passenger's airbag has been deactivated.
- SRS control module fault memory can only be checked using diagnostic equipment connected to the data link connector (DLC).

Deactivation warning lamp

- Switch ignition ON.
- If front passenger's airbag deactivated: Lamp remains illuminated.

Disarm the system

When

- Headlining or post trim removal or replacement, if inflatable curtains fitted.
- Fascia/instrument panel removal or replacement.
- Front seat belt removal or replacement.
- Front seat repair or replacement.
- Repair work around SRS components, especially airbags and pretensioners.
- SRS component removal or replacement.
- Steering wheel/column repair or replacement.
- Welding operations.

How

- Ensure ignition switched OFF.
- Remove ignition key.
- Disconnect battery earth lead. Make sure accidental reconnection is not possible.
- No waiting time required before commencing work.

Additional procedures

- Remove airbag(s) and pyrotechnic pretensioners, if temperature is likely to be more than 100°C.

Arm the system

How

- Ensure vehicle interior is unoccupied.
- Switch ignition ON.
- Close all doors.
- Reconnect battery earth lead.
- Check SRS warning lamp operation.

After deployment

Check

- All mounting brackets for SRS components.
- All SRS components including undeployed airbag(s)/pretensioner(s).
- Fascia/instrument panel.
- Seat assemblies.
- Seat belts, including buckles and anchorage points.
- Steering wheel and column.
- Surrounding components and trims.
- SRS control module.
- SRS control module fault memory.
- SRS wiring harness and multi-plugs for charred or damaged areas.

Renew

- All deployed or damaged airbags.
- Fascia/instrument panel, if damaged.
- Front passenger's airbag nuts, if passenger's airbag deployed.
- Headlining or post trims, if damaged.

- Mounting brackets, if damaged.
- Seat belt(s), if damaged.
- Seat belt(s), if in operation during collision or pretensioner(s) deployed.
- Seat backrest padding and cover, if side airbag deployed.
- Seat backrest cover clips, if side airbag replaced (MUST be installed at the same positions).
- Seat components, if damaged.
- Side crash sensor, if damaged or side airbag deployed.
- Side crash sensor, if floor pan deformed near component.
- Spiral cable, if damaged or driver's airbag deployed.
- Steering column, if damaged.
- Steering wheel, if damaged.
- Surrounding components and trims, if damaged.
- SRS control module, if damaged or floor pan tunnel is deformed within 200 mm of component.
- SRS control module, if driver's or front passenger's airbag deployed.
- SRS control module, if side airbag(s) or pyrotechnic pretensioner(s) deployed 3 times.

NOTE: Replacement SRS control module will require programming.

- SRS wiring harness and multi-plugs, if charred or damaged areas found.
- Upper post trims, if inflatable curtain deployed.

Disposal

- Vehicle manufacturer suggests that deployed SRS components are sealed in a plastic bag and disposed of in accordance with local regulations.

Steering wheel removal and installation

Special attention

- Disarm system and remove driver's airbag.
- Centralise steering before removing steering wheel.
- With electronic stability program (ESP): Spiral cable incorporates steering angle sensor, ensure yellow spot visible through hole in spiral cable housing [Fig. 1](#) [1].
- With ESP: During spiral cable installation, steering angle sensor basic setting MUST be carried out using diagnostic equipment.
- Without ESP: No alignment marks. Spiral cable MUST NOT be rotated while steering wheel removed.
- Ensure spiral cable remains centralised during reassembly.
- Replacement spiral cable held in central position by cable tie. Remove during installation.

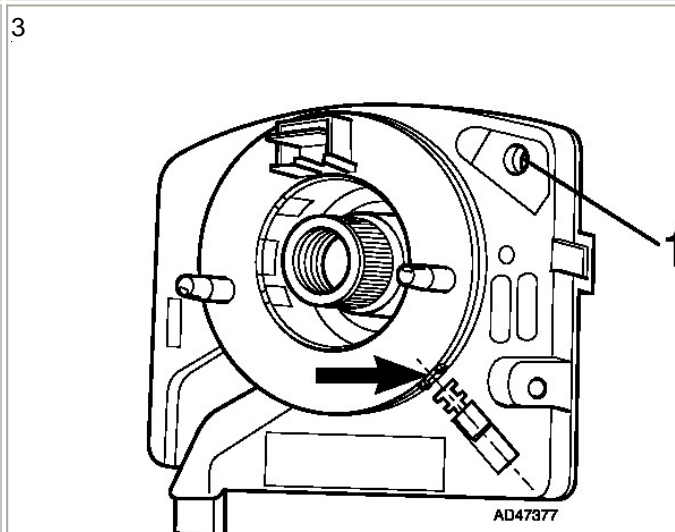
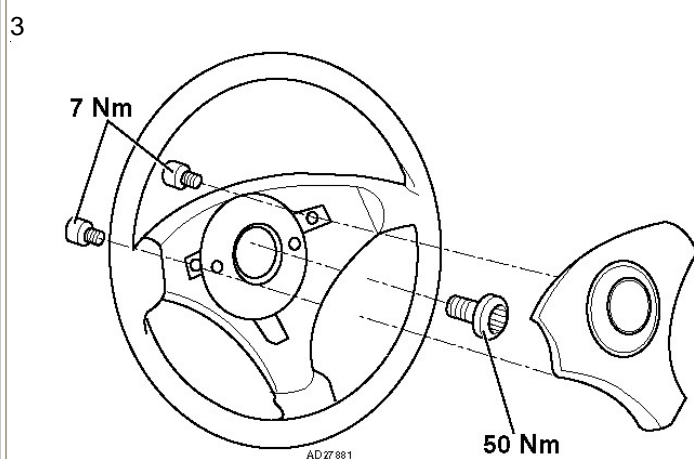
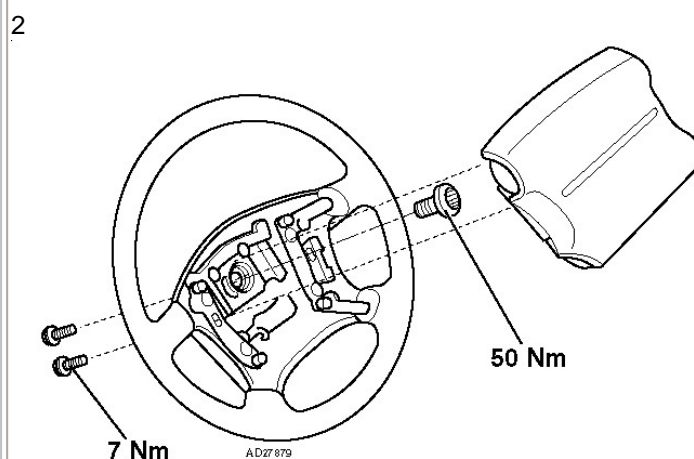
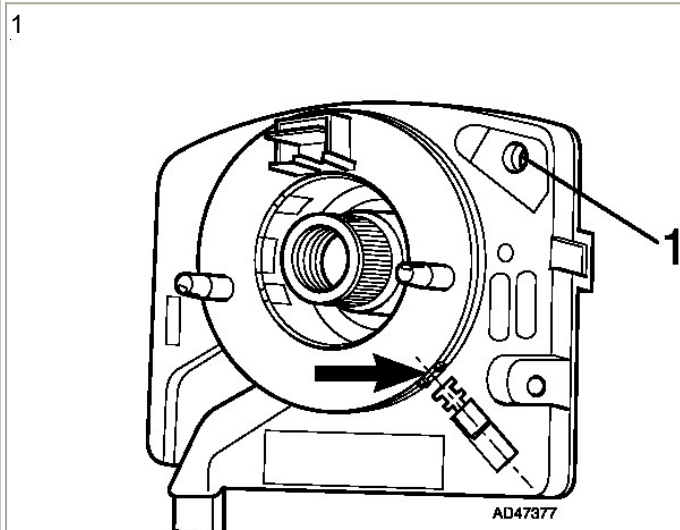
Steering wheel and airbag assembly - standard steering wheel [Fig. 2](#)

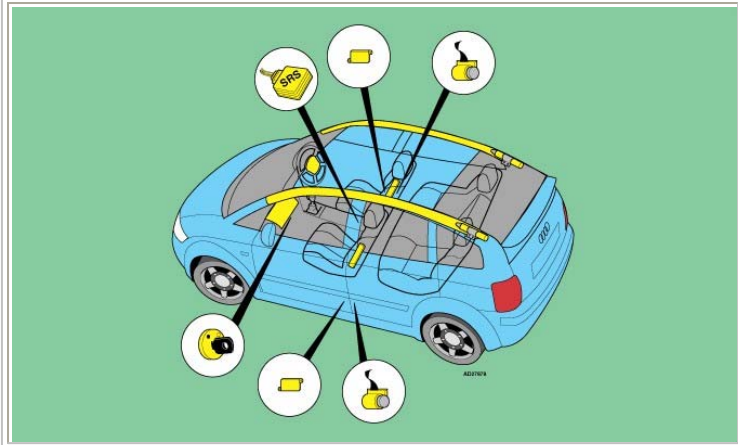
Steering wheel and airbag assembly - sports steering wheel [Fig. 3](#)

Spiral cable alignment marks - with ESP [Fig. 1](#)

Tightening torques

Driver's airbag	7 Nm
Front passenger's airbag - renew nuts	9 Nm
Front passenger's airbag support frame	12 Nm
Front passenger's airbag support frame bracket	4 Nm
Front seat	23 Nm
Front seat belt inertia reel	55 Nm
Front seat belt buckle	55 Nm
Front seat belt lower anchorage point	55 Nm
Front seat belt upper anchorage point	55 Nm
Front seat belt B post guide	5 Nm
Front side airbag	4 Nm
Inflatable curtain	4,5 Nm
Rear seat belt inertia reel	55 Nm
Rear seat belt buckle	55 Nm
Rear seat belt lower anchorage point	55 Nm
Side crash sensor	7 Nm
Steering wheel - renew bolt	50 Nm
SRS control module	7 Nm





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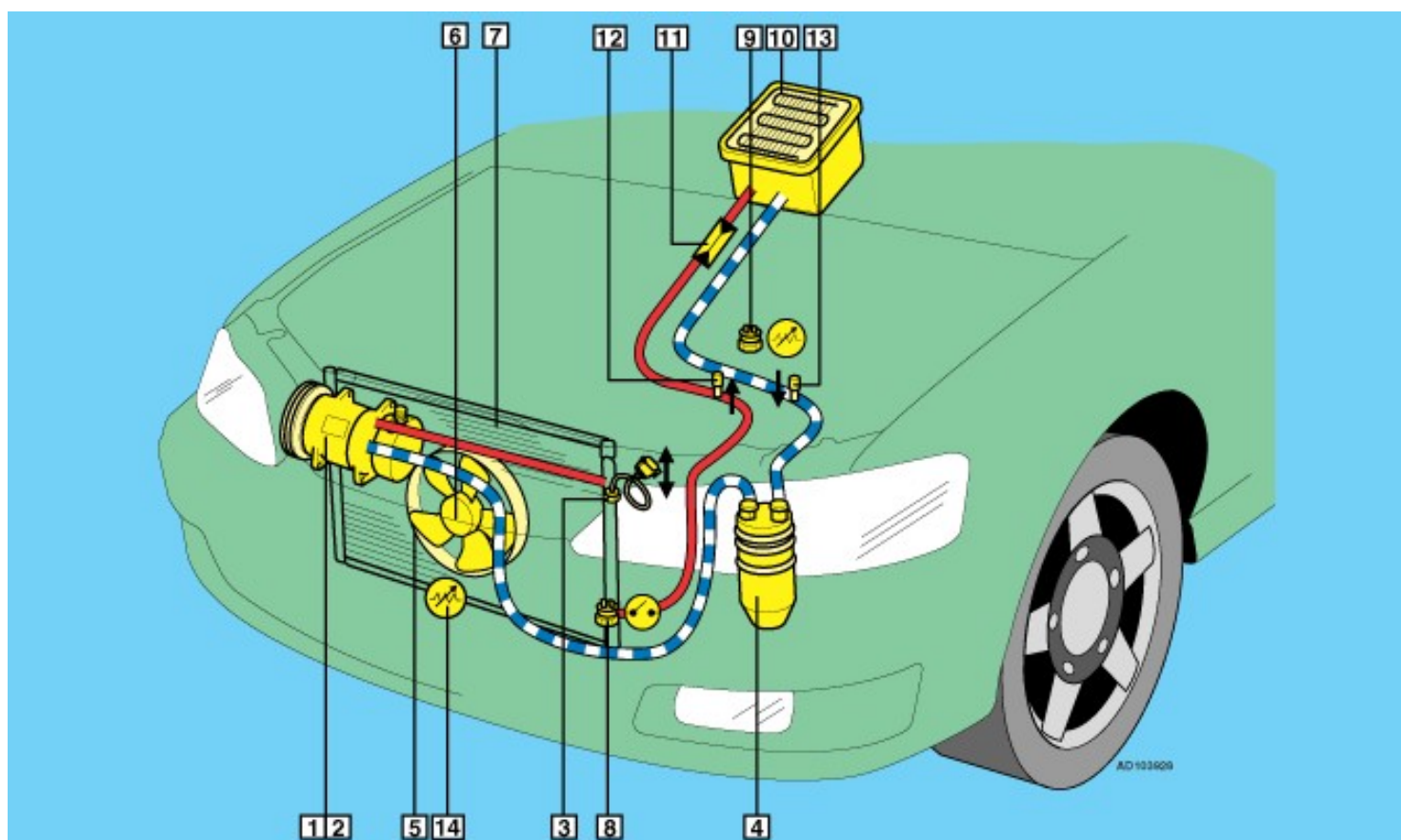


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1	AC compressor
2	AC compressor variable displacement solenoid - on compressor
3	AC refrigerant pressure sensor
4	Accumulator/drier
5	Condenser
6	Engine coolant blower motor
7	Engine coolant blower motor control module
8	Engine coolant blower motor temperature switch
9	Engine coolant temperature (ECT) sensor
10	Evaporator
11	Fixed orifice tube
12	High pressure service connector
13	Low pressure service connector
14	Outside air temperature sensor

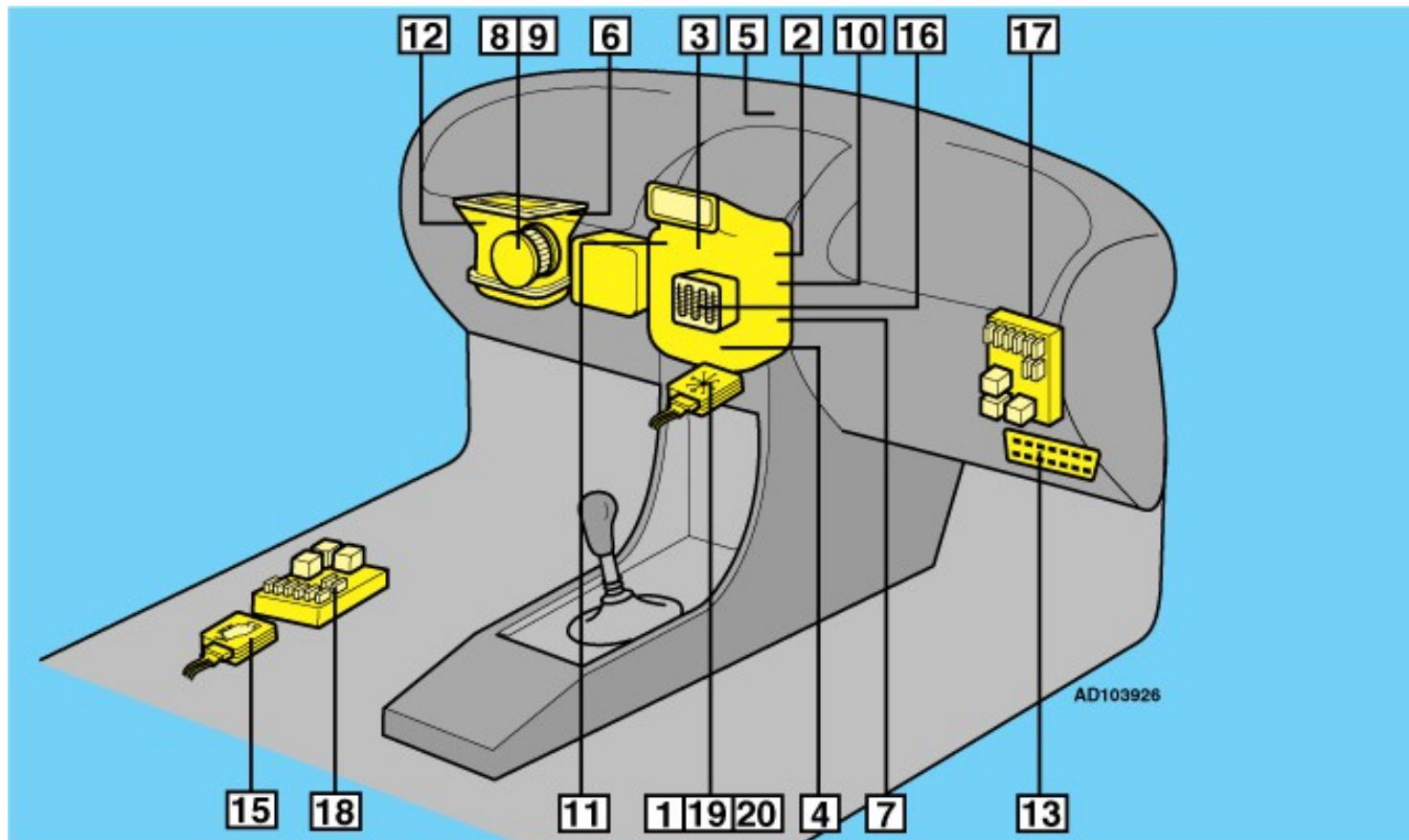




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1	AC control module - in AC/heater function control panel
2	AC evaporator temperature sensor
3	AC fascia vent temperature sensor
4	AC footwell vent temperature sensor
5	AC sunlight sensor
6	AC/heater air intake temperature sensor
7	AC/heater air mix flap motor
8	AC/heater blower control module
9	AC/heater blower motor
10	AC/heater defrost flap motor
11	AC/heater fascia flap motor, centre
12	AC/heater recirculation flap motor
13	Data link connector (DLC)
14	Diagnostic module - in instrument panel
15	Engine control module (ECM)
16	Evaporator
17	Fuse box/relay plate, fascia
18	Fuse box/relay plate, footwell
19	In-car temperature sensor - in AC/heater function control panel
20	In-car temperature sensor blower - in AC/heater function control panel
21	Instrumentation control module - in instrument panel

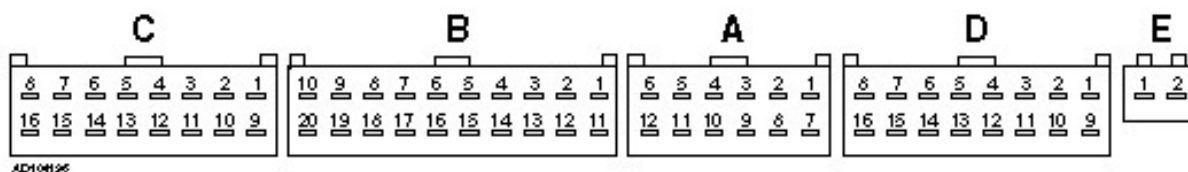




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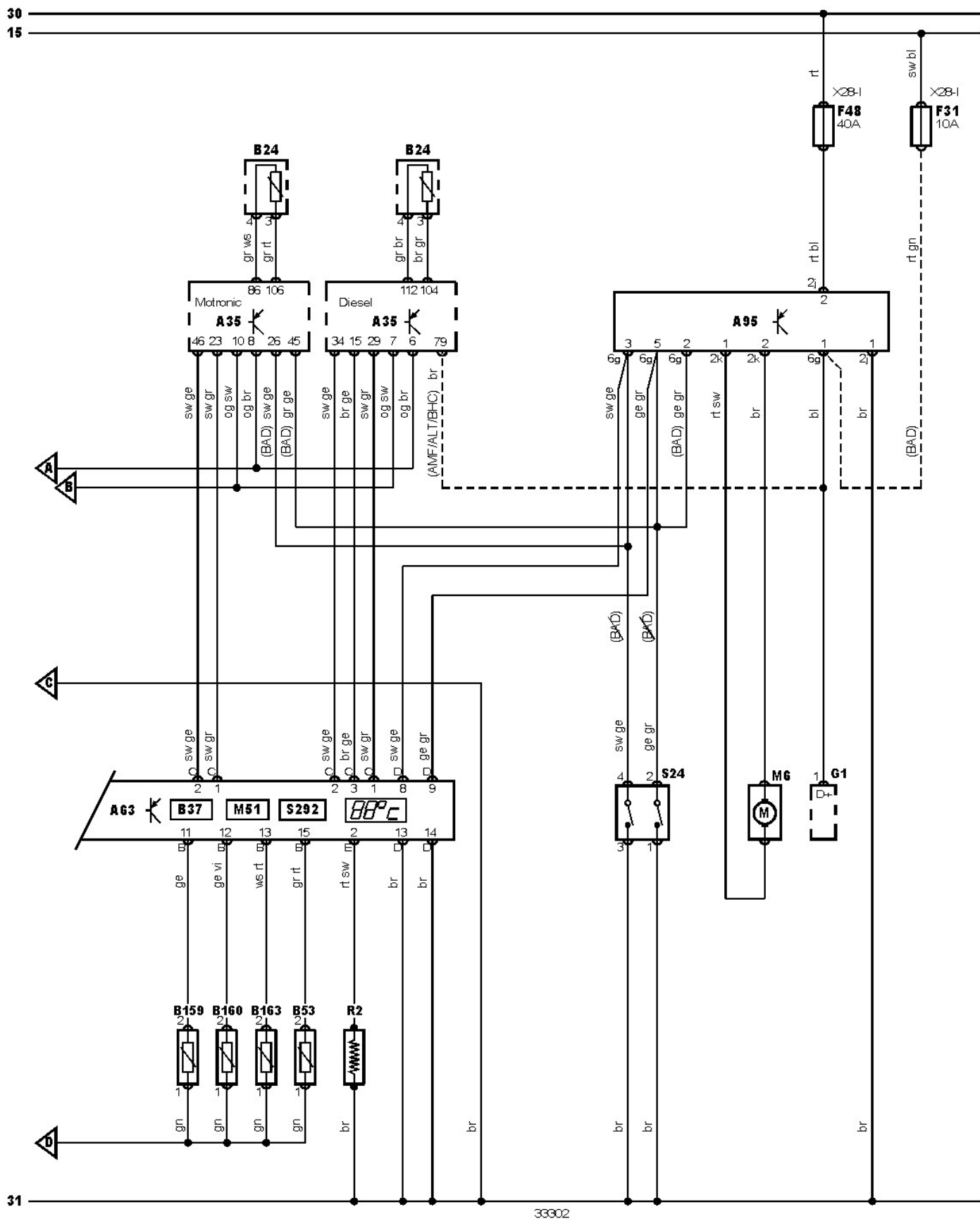
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M114	AC/heater air mix flap motor
A176	AC/heater blower control module
M7	AC/heater blower motor
M113	AC/heater defrost flap motor
M116	AC/heater fascia flap motor, centre
S292	AC/heater function control panel
M105	AC/heater recirculation flap motor
G1	Alternator
31	Battery -
30	Battery +
CAN-H	Controller area network (data bus) high
CAN-L	Controller area network (data bus) low
X1	Data link connector (DLC)
A130	Diagnostic module
A35	Engine control module (ECM)
M6	Engine coolant blower motor
A95	Engine coolant blower motor control module
S24	Engine coolant blower motor temperature switch
B24	Engine coolant temperature (ECT) sensor
F	Fuse
X28-I	Fuse box/relay plate, fascia
R2	Heated rear window
K76	Ignition auxiliary circuits relay
S1	Ignition switch
15	Ignition switch - ignition ON
B37	In-car temperature sensor
M51	In-car temperature sensor blower
A5	Instrument panel
A75	Instrumentation control module
B61	Outside air temperature sensor
VAN-H	Vehicle area network (data bus) high
VAN-L	Vehicle area network (data bus) low
K8	Windscreen wash/wipe intermittent relay
M2	Windscreen wiper motor



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x = braided cable	y = high tension	z = non-cable connection	

NOTE: In certain diagrams (Citroen, Peugeot & Renault), colour codes are replaced by numbers which are used to identify a particular cable and not the colour. In this instance, the cables will be numbered at each end close to the harness connector.



33302



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Emission control system

Oxygen sensor (O2S)/heated oxygen sensor (HO2S)

Checking - Zirconia & Titania type

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Voltage
Sensor earth	Ignition ON	0 V approx.
Signal - Zirconia type	Engine running	0,04-1 V (fluctuating)
Signal - Titania type	Engine running	0-5 V (fluctuating)
Heater earth	Engine running	0 V or 0-12 V switching
Heater supply	Engine running	11-14 V approx.

NOTE: Probing O2S terminals should reveal one terminal (sensor earth) with a voltage at or near 0 V and one terminal (signal) with a fluctuating voltage. HO2S have 2 extra wires for the heater. Probing HO2S heater wires should reveal one (heater earth) with a voltage at or near 0 V and one wire (heater supply) at or near battery voltage. On some models the heater earth is controlled by the engine control module (ECM) and is switched on and off or modulated dependent on engine operating conditions.

- Ensure engine is at normal operating temperature.
- Do not disconnect multi-plug. Access O2S/HO2S multi-plug terminals.
- Start engine.
- Allow to idle.
- Check voltage between O2S/HO2S terminals and earth.
- Increase engine speed sharply two or three times.
- Check voltage between O2S/HO2S signal terminal and earth.

Checking - broadband type

NOTE: Correct diagnosis can only be based on DTC retrieval.

Exhaust gas recirculation (EGR) solenoid

Checking - [Fig. 30](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	30-40 Ω approx.
Supply voltage	Battery voltage

NOTE: Probing EGR solenoid terminals should reveal one terminal (supply) with a voltage at or near battery voltage and one terminal (signal) with a voltage switching between 0 V and battery voltage. On most models the EGR solenoid earth is controlled by the engine control module (ECM) and is switched on and off or modulated dependent on operating conditions.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access EGR solenoid multi-plug terminals.
- Switch ignition ON.
- Check voltage between harness multi-plug terminal and earth.
- If voltage not as specified: Start engine.
- Check voltage between harness multi-plug terminal and earth.
- If voltage not as specified: Check wiring.
- Ensure ignition switched OFF.
- Disconnect EGR solenoid multi-plug.
- Check resistance between EGR solenoid terminals.

NOTE: The EGR system will only operate when the programmed operating conditions are met. These conditions may include engine temperature, engine speed, engine load and vehicle road speed.

Exhaust gas recirculation (EGR) valve position sensor

Checking - [Fig. 30](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Voltage
Supply	Ignition ON	5 V approx.
Earth	Ignition ON	0 V
Signal	Ignition ON - valve closed	0,7-1,5 V approx.

NOTE: Probing EGR valve position sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V and one terminal (signal) with a variable voltage dependent upon EGR valve position.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access EGR solenoid multi-plug terminals.
- Switch ignition ON.
- Check voltage between harness multi-plug terminals and earth.
- Start engine and allow to idle.
- Check voltage between harness multi-plug terminal and earth.
- If voltage not as specified: Check wiring.

NOTE: The EGR system will only operate when the programmed operating conditions are met. These conditions may include engine temperature, engine speed, engine load and vehicle road speed.

Evaporative emission (EVAP) canister purge valve

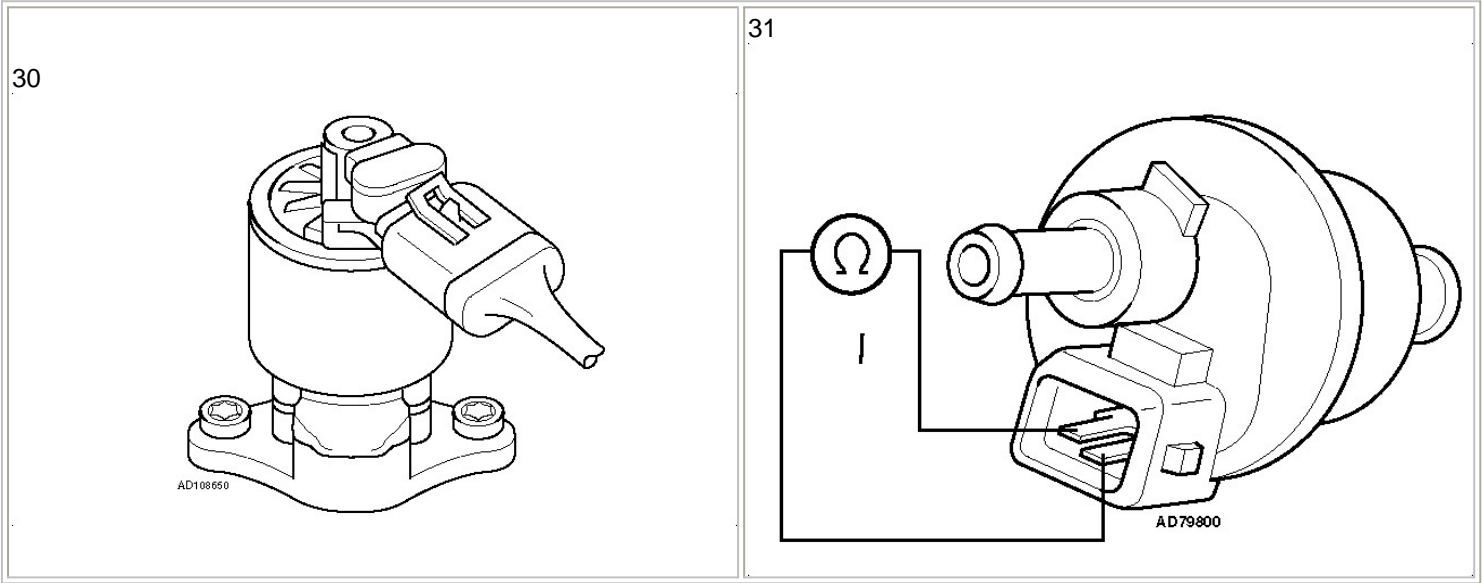
WARNING: This information in NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	20-50 Ω approx.
Voltage	Battery voltage

NOTE: Probing EVAP canister purge valve terminals should reveal one terminal (supply) with a voltage at or near battery voltage and one terminal (signal) with a variable voltage dependent upon EVAP canister purge valve operation. On most models the EVAP canister purge valve earth is controlled by the engine control module (ECM) and is switched on and off or modulated dependent on operating conditions.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access EVAP canister purge valve multi-plug terminals.
- Start engine and allow to idle.
- Check voltage between harness multi-plug terminal and earth.
- Ensure ignition switched OFF.
- Disconnect EVAP valve multi-plug.
- Check resistance between EVAP valve terminals.

NOTE: The EVAP canister purge valve will only operate when the programmed operating conditions are met. These conditions may include engine temperature, engine speed, engine load and vehicle road speed.

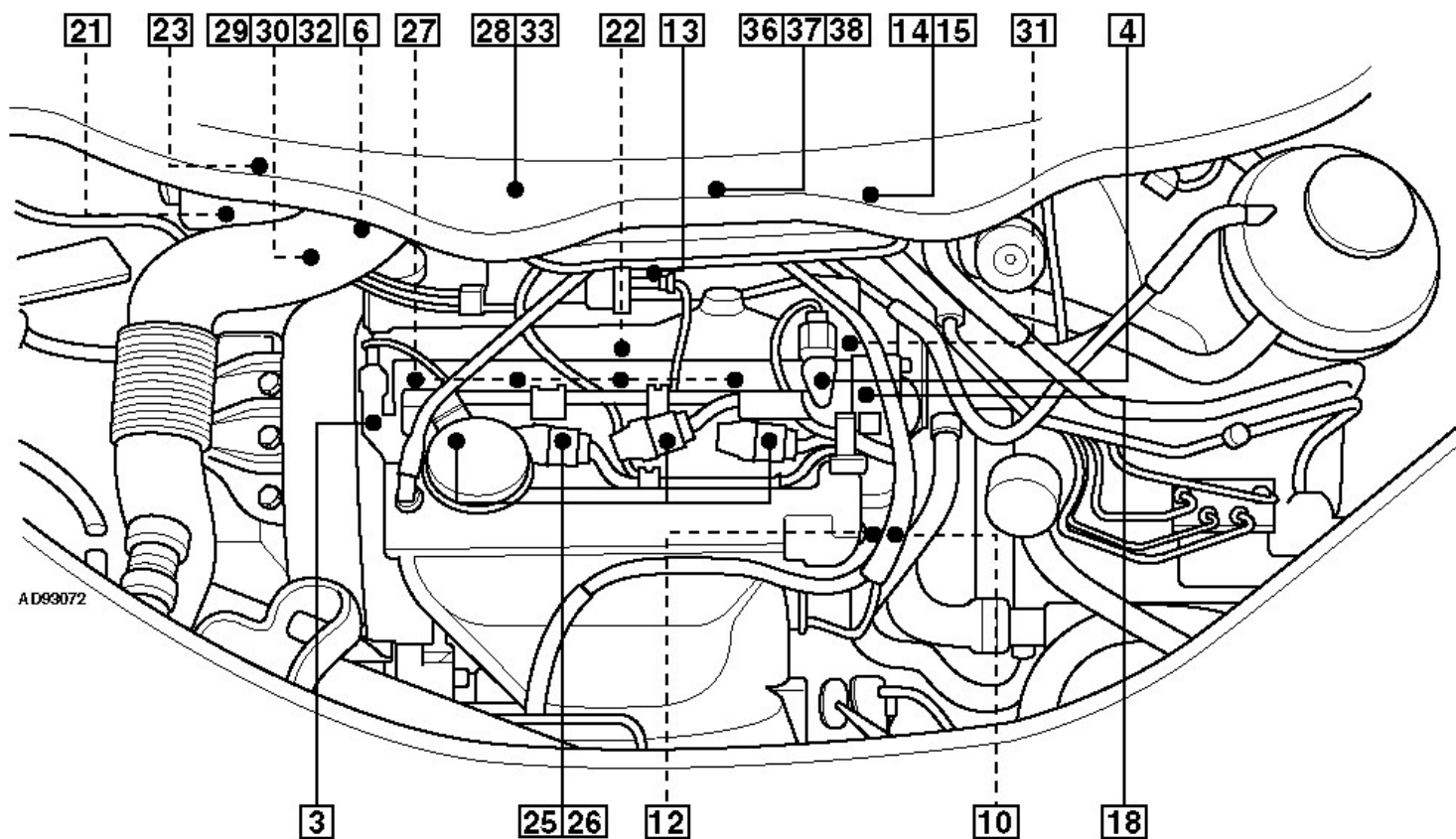




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1	Accelerator pedal position (APP) sensor - above pedal
2	Brake pedal position (BPP) switch - above pedal
3	Camshaft position (CMP) actuator, intake
4	Camshaft position (CMP) sensor
5	Clutch pedal position (CPP) switch - above pedal
6	Crankshaft position (CKP) sensor
7	Data link connector (DLC) - under fascia, driver's side
8	Engine control module (ECM) - LH footwell - under carpet
9	Engine control (EC) relay - fuse box/relay plate, footwell 2 - under carpet
10	Engine coolant temperature (ECT) sensor 1
11	Engine coolant temperature (ECT) sensor 2 - on radiator outlet
12	Engine coolant thermostat
13	Evaporative emission (EVAP) canister purge valve
14	Exhaust gas recirculation (EGR) valve actuator
15	Exhaust gas recirculation (EGR) valve position sensor
16	Exhaust gas temperature sensor - before cat
17	Fuel filter - near tank
18	Fuel high-pressure pump
19	Fuel lift pump - in tank
20	Fuel lift pump relay - fuse box/relay plate, footwell 1 - under carpet
21	Fuel pressure regulator control solenoid
22	Fuel rail pressure (FRP) sensor - in lower intake manifold
23	Fuel flow control valve
24	Heated oxygen sensor (HO2S) - before cat
25	Ignition amplifiers
26	Ignition coils
27	Injectors
28	Intake air temperature (IAT) sensor - in mass air flow (MAF) sensor
29	Intake manifold air control actuator position sensor
30	Intake manifold air control solenoid
31	Knock sensor (KS)
32	Manifold absolute pressure (MAP) sensor
33	Mass air flow (MAF) sensor
34	Nitrogen oxide (NOx) sensor - after cat
35	Nitrogen oxide (NOx) sensor control module - LH footwell - under carpet
36	Throttle control unit
37	Throttle motor - in throttle control unit
38	Throttle motor position sensor - in throttle control unit





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Engine sensors

Engine coolant temperature (ECT) sensor

Checking - except Ford - [Fig. 26](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Temperature	Resistance
0°C	6000 Ω approx.
10°C	3500 Ω approx.
20°C	2500 Ω approx.
40°C	1200 Ω approx.
60°C	600 Ω approx.
80°C	300 Ω approx.
100°C	180 Ω approx.

- Ensure ignition switched OFF.
- Disconnect ECT sensor multi-plug.
- Relieve residual pressure in cooling system.
- Remove ECT sensor from engine.
- Immerse ECT sensor probe in coolant of specified temperature.
- Check resistance between ECT sensor terminals.
- ECT sensor may be checked in situ if engine temperature and resistance readings are compared.

Checking - Ford - [Fig. 26](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Temperature	Resistance
0°C	95000 Ω approx.
20°C	38000 Ω approx.
40°C	16000 Ω approx.
60°C	7500 Ω approx.
80°C	3800 Ω approx.

- Ensure ignition switched OFF.
- Disconnect ECT sensor multi-plug.
- Relieve residual pressure in cooling system.
- Remove ECT sensor from engine.
- Immerse ECT sensor probe in coolant of specified temperature.
- Check resistance between ECT sensor terminals.
- ECT sensor may be checked in situ if engine temperature and resistance readings are compared.

Crankshaft position (CKP) sensor/engine speed (RPM) sensor/camshaft position (CMP) sensor

Checking resistance - inductive type - [Fig. 27](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	400-1200 Ω approx.

- Ensure ignition switched OFF.
- Disconnect sensor multi-plug.
- Check resistance between sensor terminals.

Checking - Hall-effect type - [Fig. 28](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Voltage
Earth	Ignition ON	0 V
Supply	Ignition ON	5 V or battery voltage
Signal	Engine turning	0-5 V approx. switching

NOTE: Probing Hall sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V or battery voltage and one terminal (signal) with a switching voltage between 0 V and 5 V when the engine is turned.

NOTE: Disconnect injector multi-plug(s) before tests, to prevent engine from starting.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access sensor multi-plug terminals.
- Switch ignition ON.

- Check voltage between harness multi-plug terminals.
- Turn engine slowly.
- Check voltage between harness multi-plug terminals.
- If voltage not as specified: Check wiring.

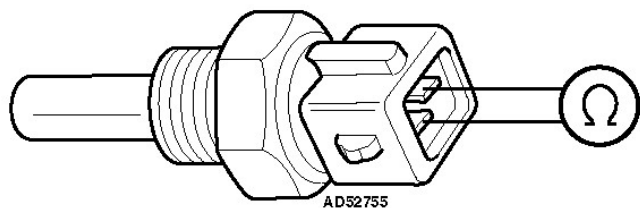
Knock sensor (KS)

Checking - Fig. 29

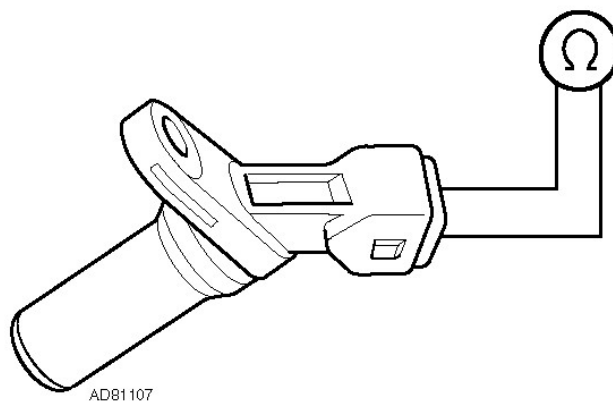
NOTE: For accurate model specific torque information, refer to Technical Data module.

- Ensure ignition switched OFF.
- Disconnect KS multi-plug.
- Remove KS.
- Ensure cylinder block and KS mating faces are free from corrosion and clean.
- Refit KS.
- Tighten fixing to specified torque.

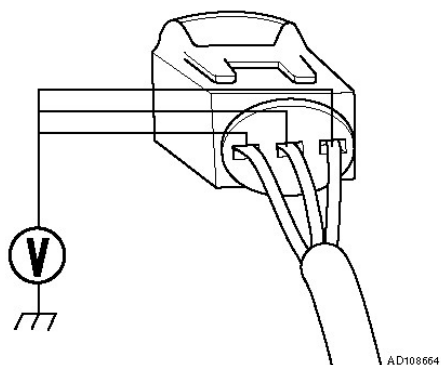
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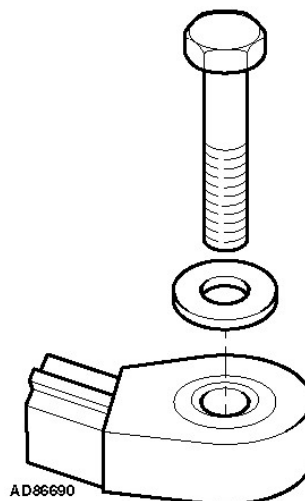
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General information

- Carry out road test for at least 10 minutes.
- Automatic transmission in 'P' or 'N'.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

NOTE: Self-diagnosis output using 4-digit trouble codes may not display all available diagnostic information (early models).

Trouble code identification

VAG type 4-digit	Fault location	Probable cause
1111	Engine control module (ECM) - defective	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator
2111	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
2113	Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2141	Knock control - control limit exceeded	ECM
2142	Knock sensor (KS) 1	Wiring, KS, ECM
2144	Knock sensor (KS) 2	Wiring, KS, ECM
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2214	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor
2222	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
2231	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
2234	Engine control module (ECM) - supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control (EC) relay, wiring
2242	Mixture adjustment resistor	Wiring, mixture adjustment resistor

2243	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2314	Engine/gearbox electrical connection	Wiring, transmission fault
2322	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2323	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor
2324	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
2341	Heated oxygen sensor (HO2S) - lambda control	Heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAF sensor filament burn-off, wiring, HO2S
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2411	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
2412	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2413	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
3434	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay
4312	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
4332	Engine control module (ECM) - output stages	Wiring, ECM controlled components
4343	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
4411	Injector 1	Wiring, fuse, injector
4412	Injector 2	Wiring, fuse, injector
4413	Injector 3	Wiring, fuse, injector
4414	Injector 4	Wiring, fuse, injector
4421	Injector 5	Wiring, injector
4422	Injector 6	Wiring, injector
4431	Idle air control (IAC) valve	Wiring, IAC valve
4433	Fuel pump relay	Wiring, fuse, fuel pump relay
4444	No fault found	-

VAG type 5-digit	EOBD type	Fault location	Probable cause
-	P0, P2, U0	Refer to EOBD trouble code tables	-
00000	-	No fault found	-
00263	-	Transmission control module (TCM) - incorrect signal	Wiring short to earth, TCM trouble code(s) stored, ECM
00268	-	Idle speed control (ISC) actuator	Wiring, ISC actuator
00281	-	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	-	Idle speed control (ISC) actuator/throttle motor	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator/throttle motor
00305	-	Instrument panel, fuel consumption signal	Wiring, instrument panel
00513	-	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
00514	-	Crankshaft position (CKP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, CKP sensor

00515	-	Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
00516	-	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00518	-	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00519	-	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
00520	-	Mass air flow (MAF) sensor	Wiring, MAF sensor
00521	-	Mixture adjustment resistor	Wiring, mixture adjustment resistor
00522	-	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	-	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00524	-	Knock sensor (KS) 1	Wiring, KS, ECM
00525	-	Heated oxygen sensor (HO2S) 1 - implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00526	-	Stop lamp switch	Wiring, stop lamp switch
00527	-	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00528	-	Barometric pressure (BARO) sensor	Wiring, BARO sensor
00529	-	Crankshaft position (CKP) sensor	Wiring, CKP sensor
00530	-	Idle speed control (ISC) actuator/position sensor	Wiring, poor connection, multi-plug incorrectly wired, ISC actuator/position sensor
00532	-	Engine control module (ECM) - supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control (EC) relay, wiring
00533	-	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
00534	-	Engine oil temperature (EOT) sensor	Wiring, EOT sensor
00535	-	Engine control module (ECM) - knock control 1	Wiring, KS, ECM
00536	-	Engine control module (ECM) - knock control 2	Wiring, KS, ECM
00537	-	Heated oxygen sensor (HO2S) - lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00539	-	Fuel temperature sensor	Wiring, fuel temperature sensor
00540	-	Knock sensor (KS) 2	Wiring, KS, ECM
00542	-	Injector needle lift sensor	Air in fuel system, fuel level low, wiring, injector needle lift sensor
00543	-	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor, AT fault, ECM
00544	-	Maximum boost pressure exceeded	Hoses interchanged/not connected, hoses blocked/leaking, TC wastegate actuator/regulating valve, MAP sensor
00545	-	ECM/TCM electrical connection	TCM trouble code(s) stored, wiring, transmission fault
00546	-	Data link connector (DLC) - defective	Wiring
00549	-	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
00550	-	Start of injection - control	Wiring, fuel injection timing solenoid, injector needle lift sensor, air in fuel system, fuel level low, pump timing
00552	-	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor
00553	-	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
00554	-	Heated oxygen sensor (HO2S) - lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00555	-	Heated oxygen sensor (HO2S) 2 - implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00557	-	Power steering pressure (PSP) switch - short to earth	Wiring short to earth, PSP switch

00560	-	Exhaust gas recirculation (EGR) - control difference	Intake leak, EGR valve/solenoid
00561	-	Mixture control (MC)	Trouble codes 00525/00533 stored, fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP sensor, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
00575	-	Intake manifold pressure	Intake leak/blockage, MAF sensor, MAP sensor, TC wastegate actuator/regulating valve, hoses interchanged/not connected, wiring
00577	-	Knock control, cylinder 1 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00578	-	Knock control, cylinder 2 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00579	-	Knock control, cylinder 3 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00580	-	Knock control, cylinder 4 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00581	-	Knock control, cylinder 5 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00582	-	Knock control, cylinder 6 - control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00585	-	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
00586	-	Exhaust gas recirculation (EGR) system - control	EGR solenoid
00609	-	Ignition amplifier, primary circuit 1	Wiring, ignition amplifier
00610	-	Ignition amplifier, primary circuit 2	Wiring, ignition amplifier
00611	-	Ignition amplifier, primary circuit 3	Wiring, ignition amplifier
00624	-	AC signal - compressor cut-in	Wiring, AC system
00625	-	Vehicle speed signal	Wiring, speedometer, VSS
00626	-	Glow plug warning lamp	Wiring, glow plug warning lamp
00627	-	Fuel filter water level sensor	Water in filter, wiring, fuel filter water level sensor
00628	-	Fuel injection pump control module - engine stop malfunction	Wiring, fuel injection pump
00635	-	Heated oxygen sensor (HO2S) 1, bank 1 - heater circuit malfunction	Wiring, HO2S
00638	-	ECM/TCM electrical connection	Wiring, transmission fault
00640	-	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay
00650	-	Clutch pedal position (CPP) switch - short to positive	Wiring short to positive, CPP switch
00653	-	Transmission control module (TCM)/TR sensor - implausible TR signal	Wiring, transmission fault, poor connection
00667	-	Outside air temperature signal	Wiring, instrument panel, AC system, outside air temperature sensor
00668	-	Engine control module (ECM) - supply voltage low	Battery, wiring, engine control (EC) relay
00670	-	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
00671	-	Cruise control master switch	Wiring, cruise control master switch
00740	-	Camshaft position (CMP) sensor	Wiring, CMP sensor
00741	-	Stop lamp switch/brake pedal position (BPP) switch - signal correlation	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
00750	-	Malfunction indicator lamp (MIL) - circuit malfunction	ECM incorrectly coded, wiring, MIL
00758	-	Secondary air injection (AIR) system	AIR solenoid/relay, wiring
00765	-	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
00777	-	Accelerator pedal position (APP) sensor	Incorrectly set, wiring, APP sensor

00792	-	AC pressure switch	Wiring, AC pressure switch
01013	-	AC compressor clutch, load signal	Wiring, AC system
01025	-	Malfunction indicator lamp (MIL)	Wiring, MIL
01028	-	Engine coolant blower motor relay	Wiring, engine coolant blower motor relay
01044	-	Engine control module (ECM) - coding	Incorrectly coded
01050	-	Glow plug monitoring	Fuse, wiring, glow plug relay, glow plugs
01052	-	Fuel lever position sensor	Wiring, fuel lever position sensor
01087	-	Engine control module (ECM) - basic setting	Basic setting not completed, throttle valve tight/sticking
01088	-	Mixture control (MC)	Fuel level low, fuel pressure/pump, MAP sensor, MAF sensor, intake/exhaust leak, EVAP canister purge valve, excessive fuel in engine oil, injector(s)
01117	-	Alternator load signal	Wiring, alternator
01119	-	Gear recognition signal - AT	Wiring
01120	-	Camshaft position (CMP) control, bank 1 - mechanical fault	Wiring, fuse, CMP actuator
01121	-	Camshaft position (CMP) control, bank 2 - mechanical fault	Wiring, fuse, CMP actuator
01126	-	Engine RPM signal	Wiring, CKP/RPM sensor, instrument panel
01163	-	Backfire	Intake leak, wiring, ignition amplifier, injector(s)
01165	-	Idle speed control (ISC) actuator/throttle motor	Accelerator cable adjustment, throttle valve, wiring, ISC actuator/throttle motor, basic setting not carried out
01167	-	Full throttle stop solenoid	Wiring, full throttle stop valve
01168	-	Idle speed boost solenoid	Wiring, full throttle stop valve, idle speed boost solenoid
01169	-	Door contact switch, driver's	Wiring, door contact switch
01170	-	Fuel injection timing sensor	Wiring, fuel injection timing sensor
01177	-	Engine control module (ECM) - defective	ECM
01180	-	Engine/AC electrical connection	Wiring
01182	-	Mass air flow (MAF) sensor/throttle position (TP) sensor - signal incompatibility	Throttle valve sticking, ISC actuator/throttle motor sticking/mechanically damaged, incorrect throttle control unit, intake leak between MAF sensor and throttle valve, air filter blocked
01183	-	Malfunction indicator lamp (MIL) - circuit malfunction	ECM incorrectly coded, wiring, MIL
01193	-	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
01194	-	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
01196	-	CAN data bus, TCM - incorrect signal	Wiring
01204	-	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
01208	-	Engine control module (ECM) - data changed	ECM
01209	-	Alternator speed signal	Wiring, alternator
01235	-	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
01237	-	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
01242	-	Engine control module (ECM) - output stages	Wiring, ECM controlled components
01243	-	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01247	-	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
01249	-	Injector 1	Wiring, fuse, injector
01250	-	Injector 2	Wiring, fuse, injector
01251	-	Injector 3	Wiring, fuse, injector
01252	-	Injector 4	Wiring, fuse, injector
01253	-	Injector 5	Wiring, injector
01254	-	Injector 6	Wiring, injector
01257	-	Idle air control (IAC) valve	Wiring, IAC valve

01259	-	Fuel pump relay	Wiring, fuse, fuel pump relay
01262	-	Turbocharger (TC) wastegate regulating valve	Wiring, fuse, TC wastegate regulating valve
01265	-	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
01266	-	Glow plug relay	Wiring, glow plug relay
01268	-	Fuel quantity adjuster	Incorrectly set, wiring, fuel injection pump
01269	-	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
01282	-	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01283	-	Intake manifold air control actuator	Wiring, intake manifold flap, intake manifold air control actuator
01312	-	CAN data bus - defective	Trouble code(s) stored in other system(s), wiring
01314	-	Engine control module (ECM), cruise control system - defective	ECM
01315	-	CAN data bus, TCM - no signal	TCM trouble code(s) stored, wiring, matching resistor in ECM
01316	-	CAN data bus, ABS - defective	ABS control module incorrectly coded, wiring
01317	-	CAN data bus, instrumentation	Trouble code(s) stored in other system(s), wiring, instrumentation control module
01318	-	Fuel injection pump control module	Data bus wiring, fuel injection pump
01321	-	CAN data bus, SRS	SRS control module trouble code(s) stored, wiring
01375	-	Engine mounting control solenoid, bank 1 & 2	Wiring, engine mounting control solenoid
01376	-	Fuel injection pump position sensor	Wiring, fuel injection pump position sensor
01437	-	Throttle control unit - basic setting	Basic setting not carried out, CTP switch, ISC actuator/position sensor, TP sensor
01440	-	Fuel level signal	Wiring, instrument panel, fuel gauge tank sensor
01441	-	Fuel low level sensor	Wiring, fuel transfer pump, fuel level sensor
01442	-	Engine misfire - fuel pump housing empty	Fuel level low, fuel transfer pump
01575	-	Auxiliary drive - switched OFF	Auxiliary drive overloaded
01613	-	Fuel cooling pump relay - circuit malfunction	Wiring, fuel cooling pump relay
01656	-	SRS control module - crash signal	Wiring
01686	-	Engine coolant blower motor run-on relay	Wiring, engine coolant blower motor run-on relay
01695	-	Fuel temperature sensor - circuit malfunction	Wiring, fuel temperature sensor
16394	-	Camshaft position (CMP) actuator, intake/left/front, bank 1 - circuit malfunction	Wiring, CMP actuator
16395	-	Camshaft position (CMP), intake/left/front, bank 1 - timing over-advanced/system performance	Valve timing, camshaft position (CMP) actuator
16396	-	Camshaft position (CMP), intake/left/front, bank 1 - timing over-retarded	Valve timing, camshaft position (CMP) actuator
16398	-	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - timing over-advanced/system performance	Valve timing, camshaft position (CMP) actuator
16399	-	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - timing over-retarded	Valve timing, camshaft position (CMP) actuator
16414	-	Heated oxygen sensor (HO2S) 1, bank 1, heater control - circuit malfunction	Wiring open circuit, HO2S
16415	-	Heated oxygen sensor (HO2S) 1, bank 1, heater control - circuit low	Wiring short to earth, HO2S
16416	-	Heated oxygen sensor (HO2S) 1, bank 1, heater control - circuit high	Wiring short to positive, HO2S
16474	-	Fuel metering solenoid - open circuit	Wiring open circuit, fuel metering solenoid
16475	-	Fuel metering solenoid - short to earth	Wiring short to earth, fuel metering solenoid
16476	-	Fuel metering solenoid - short to positive	Wiring short to positive, fuel metering solenoid

16485	-	Mass air flow (MAF) sensor, bank 1 - range/performance problem	Intake leak, wiring, MAF sensor
16486	-	Mass air flow (MAF) sensor, bank 1 - low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
16487	-	Mass air flow (MAF) sensor, bank 1 - high input	Wiring short to positive, earth wire defective, MAF sensor
16490	-	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor - range/performance problem	Intake/exhaust leak, wiring, MAP sensor, BARO sensor
16491	-	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor - low input	Wiring short to earth, MAP sensor, BARO sensor
16492	-	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor - high input	Wiring short to positive, MAP sensor, BARO sensor
16496	-	Intake air temperature (IAT) sensor - low input	Wiring short to earth, IAT sensor
16497	-	Intake air temperature (IAT) sensor - high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
16500	-	Engine coolant temperature (ECT) sensor - range/performance problem	Coolant thermostat, poor connection, wiring, ECT sensor
16501	-	Engine coolant temperature (ECT) sensor - low input	Coolant thermostat, wiring short to earth, ECT sensor
16502	-	Engine coolant temperature (ECT) sensor - high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor
16504	-	Throttle position (TP) sensor - circuit malfunction	Poor connection, wiring, TP sensor
16505	-	Throttle position (TP) sensor - range/performance problem	Poor connection, TP sensor
16506	-	Throttle position (TP) sensor - low input	Signal wire short to earth, supply wire defective, TP sensor
16507	-	Throttle position (TP) sensor - high input	Signal wire open circuit/short to positive, earth wire defective, TP sensor
16514	-	Heated oxygen sensor (HO2S) 1, bank 1 - circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
16515	-	Heated oxygen sensor (HO2S) 1, bank 1 - voltage low	Wiring short to earth, HO2S
16516	-	Heated oxygen sensor (HO2S) 1, bank 1 - voltage high	Wiring short to positive, HO2S
16517	-	Heated oxygen sensor (HO2S) 1, bank 1 - slow response	Heating inoperative, wiring, HO2S
16518	-	Heated oxygen sensor (HO2S) 1, bank 1 - no activity detected	Wiring open circuit, heating inoperative, HO2S
16519	-	Heated oxygen sensor (HO2S) 1, bank 1 - heater circuit malfunction	Fuse, wiring, HO2S
16520	-	Heated oxygen sensor (HO2S) 2, bank 1 - circuit malfunction	Heating inoperative, wiring, HO2S
16521	-	Heated oxygen sensor (HO2S) 2, bank 1 - low voltage	Wiring short to earth, exhaust leak, HO2S
16522	-	Heated oxygen sensor (HO2S) 2, bank 1 - high voltage	Wiring short to positive, HO2S
16523	-	Heated oxygen sensor (HO2S) 2, bank 1 - slow response	Heating inoperative, wiring, HO2S
16524	-	Heated oxygen sensor (HO2S) 2, bank 1 - no activity detected	Wiring, HO2S
16525	-	Heated oxygen sensor (HO2S) 2, bank 1 - heater circuit malfunction	Wiring, HO2S
16534	-	Heated oxygen sensor (HO2S) 1, bank 2 - circuit malfunction	Wiring, HO2S

16535	-	Heated oxygen sensor (HO2S) 1, bank 2 - low voltage	Wiring short to earth, HO2S
16536	-	Heated oxygen sensor (HO2S) 1, bank 2 - high voltage	Wiring short to positive, HO2S
16537	-	Heated oxygen sensor (HO2S) 1, bank 2 - slow response	Heating inoperative, wiring, HO2S
16538	-	Heated oxygen sensor (HO2S) 1, bank 2 - no activity detected	Wiring, HO2S
16540	-	Heated oxygen sensor (HO2S) 2, bank 2 - circuit malfunction	Heating inoperative, wiring, HO2S
16541	-	Heated oxygen sensor (HO2S) 2, bank 2 - low voltage	Wiring short to earth, exhaust leak, HO2S
16542	-	Heated oxygen sensor (HO2S) 2, bank 2 - high voltage	Wiring short to positive, HO2S
16543	-	Heated oxygen sensor (HO2S) 2, bank 2 - slow response	Heating inoperative, wiring, HO2S
16544	-	Heated oxygen sensor (HO2S) 2, bank 2 - no activity detected	Wiring, HO2S
16545	-	Heated oxygen sensor (HO2S) 2, bank 2 - heater circuit malfunction	Wiring, HO2S
16554	-	Fuel trim (FT), bank 1 - malfunction	Intake leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16555	-	System too lean, bank 1	Intake/exhaust leak, AIR system, MAP sensor, MAF sensor, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16556	-	System too rich, bank 1	EVAP canister purge valve, fuel pressure, injector(s), HO2S
16557	-	Fuel trim (FT), bank 2 - malfunction	Fuel pressure/pump, injector(s), AIR system, hose connection(s), intake leak
16558	-	System too lean, bank 2	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose connection(s)
16559	-	System too rich, bank 2	Fuel pressure, injector(s), EVAP canister purge valve
16575	-	Fuel rail pressure (FRP) sensor - range/performance problem	Wiring, FRP sensor
16576	-	Fuel rail pressure (FRP) sensor - low input	Wiring short to earth, FRP sensor
16577	-	Fuel rail pressure (FRP) sensor - high input	Wiring short to positive, FRP sensor
16578	-	Fuel rail pressure (FRP) sensor - circuit intermittent	Wiring open circuit, FRP sensor
16581	-	Engine oil temperature (EOT) sensor - low input	Wiring short to earth, EOT sensor
16582	-	Engine oil temperature (EOT) sensor - high input	Wiring short to positive, EOT sensor
16585	-	Injector 1 - circuit malfunction	Wiring, injector
16586	-	Injector 2 - circuit malfunction	Wiring, injector
16587	-	Injector 3 - circuit malfunction	Wiring, injector
16588	-	Injector 4 - circuit malfunction	Wiring, injector
16589	-	Injector 5 - circuit malfunction	Wiring, injector
16590	-	Injector 6 - circuit malfunction	Wiring, injector
16603	-	Engine over speed condition	Incorrect gear change
16605	-	Throttle position (TP) sensor B - range/performance problem	Wiring, TP sensor
16606	-	Throttle position (TP) sensor B - low input	Wiring short to earth, TP sensor
16607	-	Throttle position (TP) sensor B - high input	Wiring short to positive, TP sensor
16610	-	Accelerator pedal position (APP) sensor A/B - range/performance problem	Wiring, APP sensor
16611	-	Accelerator pedal position (APP) sensor A - low input	Wiring short to earth, APP sensor

16612	-	Accelerator pedal position (APP) sensor A - high input	Wiring short to positive, APP sensor
16614	-	Fuel pump relay - circuit malfunction	Wiring, fuel pump relay
16618	-	Engine boost condition - limit exceeded	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16619	-	Engine boost condition - limit not reached	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16620	-	Manifold absolute pressure (MAP) sensor A, TC system - range/performance problem	Intake/exhaust leak, hose connection(s), MAP sensor
16621	-	Manifold absolute pressure (MAP) sensor A, TC system - low input	Wiring short to earth, MAP sensor
16622	-	Manifold absolute pressure (MAP) sensor A, TC system - high input	Wiring short to positive, MAP sensor
16627	-	Turbocharger (TC) wastegate regulating valve A - circuit malfunction	Wiring, TC wastegate regulating valve
16629	-	Turbocharger (TC) wastegate regulating valve A - circuit low	Wiring short to earth, TC wastegate regulating valve
16630	-	Turbocharger (TC) wastegate regulating valve A - circuit high	Wiring short to positive, TC wastegate regulating valve
16645	-	Injector 1 - circuit low	Wiring short to earth, injector
16646	-	Injector 1 - circuit high	Wiring short to positive, injector
16648	-	Injector 2 - circuit low	Wiring short to earth, injector
16649	-	Injector 2 - circuit high	Wiring short to positive, injector
16651	-	Injector 3 - circuit low	Wiring short to earth, injector
16652	-	Injector 3 - circuit high	Wiring short to positive, injector
16654	-	Injector 4 - circuit low	Wiring short to earth, injector
16655	-	Injector 4 - circuit high	Wiring short to positive, injector
16657	-	Injector 5 - circuit low	Wiring short to earth, injector
16658	-	Injector 5 - circuit high	Wiring short to positive, injector
16660	-	Injector 6 - circuit low	Wiring short to earth, injector
16661	-	Injector 6 - circuit high	Wiring short to positive, injector
16684	-	Random/multiple cylinder(s) - misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
16685	-	Cylinder 1 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16686	-	Cylinder 2 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16687	-	Cylinder 3 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16688	-	Cylinder 4 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16689	-	Cylinder 5 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16690	-	Cylinder 6 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16691	-	Cylinder 7 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16692	-	Cylinder 8 - misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16705	-	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - range/performance problem	Air gap, metal particles, insecure sensor/rotor, wiring, CKP/RPM sensor
16706	-	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - no signal	Wiring, CKP/RPM sensor
16708	-	Knock control system error	Wiring, poor connection, KS, ECM

16709	-	Knock sensor (KS) 1, bank 1 - circuit malfunction	Wiring, poor connection, KS
16710	-	Knock sensor (KS) 1, bank 1 - range/performance problem	Wiring, KS incorrectly tightened, KS
16711	-	Knock sensor (KS) 1, bank 1 - low input	Insecure KS, poor connection, wiring short to earth, incorrectly tightened, KS
16712	-	Knock sensor (KS) 1, bank 1 - high input	Wiring short to positive, KS incorrectly tightened, KS
16716	-	Knock sensor (KS) 2, bank 2 - low input	Insecure KS, poor connection, wiring short to earth, KS incorrectly tightened, KS
16717	-	Knock sensor (KS) 2, bank 2 - high input	Wiring short to positive, KS incorrectly tightened, KS
16719	-	Crankshaft position (CKP) sensor - circuit malfunction	Wiring, CKP/RPM sensor
16721	-	Crankshaft position (CKP) sensor - low input	Insecure sensor, air gap, wiring short to earth, CKP/RPM sensor
16724	-	Camshaft position (CMP) sensor A, bank 1 - circuit malfunction	Wiring, CMP sensor
16725	-	Camshaft position (CMP) sensor A, bank 1 - range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
16726	-	Camshaft position (CMP) sensor A, bank 1 - low input	Wiring short to earth, CMP sensor
16727	-	Camshaft position (CMP) sensor A, bank 1 - high input	Wiring short to positive, CMP sensor
16730	-	Camshaft position (CMP) sensor A, bank 2 - range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
16731	-	Camshaft position (CMP) sensor A, bank 2 - low input	Wiring short to earth, CMP sensor
16732	-	Camshaft position (CMP) sensor A, bank 2 - high input	Wiring short to positive, CMP sensor
16735	-	Ignition coil, cylinder 1, primary/secondary - circuit malfunction	Wiring, ignition amplifier, ignition coil
16736	-	Ignition coil, cylinder 2, primary/secondary - circuit malfunction	Wiring, ignition amplifier, ignition coil
16737	-	Ignition coil, cylinder 3, primary/secondary - circuit malfunction	Wiring, ignition amplifier, ignition coil
16738	-	Ignition coil, cylinder 4, primary/secondary - circuit malfunction	Wiring, ignition amplifier, ignition coil
16764	-	Glow plugs - circuit A malfunction	Wiring, glow plug relay, fuse, glow plugs
16784	-	Exhaust gas recirculation (EGR) system - flow malfunction	Basic setting not carried out, EGR valve/solenoid
16785	-	Exhaust gas recirculation (EGR) system - insufficient flow detected	Hose leak/blockage, basic setting not carried out, EGR valve/solenoid
16786	-	Exhaust gas recirculation (EGR) system - excessive flow detected	EGR valve/solenoid, basic setting not carried out
16787	-	Exhaust gas recirculation (EGR) system - circuit malfunction	Wiring, EGR valve/solenoid
16788	-	Exhaust gas recirculation (EGR) system - range/performance problem	Hose connection(s), wiring, EGR valve/solenoid
16791	-	Exhaust gas recirculation (EGR) valve position sensor - low input	Wiring short to earth, EGR valve position sensor
16792	-	Exhaust gas recirculation (EGR) valve position sensor - high input	Wiring short to positive, EGR valve position sensor
16795	-	Secondary air injection (AIR) system - incorrect flow detected	AIR pump, AIR valve, AIR hose(s)
16796	-	Secondary air injection (AIR) solenoid A - circuit malfunction	Wiring, AIR solenoid
16802	-	Secondary air injection (AIR) pump relay A - circuit malfunction	Wiring, AIR pump relay

16804	-	Catalytic converter system, bank 1 - efficiency below threshold	Catalytic converter
16806	-	Main catalytic converter, bank 1 - efficiency below threshold	Catalytic converter
16814	-	Catalytic converter system, bank 2 - efficiency below threshold	Catalytic converter
16824	-	Evaporative emission (EVAP) system - malfunction	Hose connection(s), intake leak, EVAP canister purge valve
16825	-	Evaporative emission (EVAP) system - incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
16826	-	Evaporative emission (EVAP) system - small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
16827	-	Evaporative emission (EVAP) canister purge valve - circuit malfunction	Wiring, EVAP canister purge valve
16828	-	Evaporative emission (EVAP) canister purge valve - open circuit	Wiring open circuit, EVAP canister purge valve
16829	-	Evaporative emission (EVAP) canister purge valve - short circuit	Wiring short circuit, EVAP canister purge valve
16839	-	Evaporative emission (EVAP) system - large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
16845	-	Fuel tank level sensor - range/performance problem	Wiring, fuel tank level sensor
16864	-	Engine coolant blower motor 1 - circuit malfunction	Wiring, engine coolant blower motor
16865	-	Engine coolant blower motor 2 - circuit malfunction	Wiring, engine coolant blower motor
16885	-	Vehicle speed sensor (VSS) - range/performance problem	Wiring, speedometer, VSS, CAN data bus
16887	-	Vehicle speed sensor (VSS) - intermittent/erratic/high input	Wiring, other connected system, instrument panel, VSS
16890	-	Idle speed control (ISC) system - rpm lower than expected	Throttle control unit
16891	-	Idle speed control (ISC) system - rpm higher than expected	Throttle control unit
16894	-	Closed throttle position (CTP) switch - circuit malfunction	Wiring, CTP switch
16897	-	Engine control module (ECM) - immobilizer active	Incorrect/damaged key, ECM incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective, ECM
16916	-	AC refrigerant pressure sensor - low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor
16917	-	AC refrigerant pressure sensor - high input	AC refrigerant pressure too high (cooling fault/incorrectly charged), wiring, AC refrigerant pressure sensor
16928	-	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 - circuit malfunction	Wiring, EGRT sensor
16929	-	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 - low input	Wiring short to earth, EGRT sensor
16930	-	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 - high input	Wiring short to positive, EGRT sensor
16935	-	Power steering pressure (PSP) sensor/switch - range/performance problem	Wiring, PSP switch
16944	-	System voltage - malfunction	Fuse(s), battery, wiring, engine control (EC) relay
16946	-	System voltage - low	Fuse(s), battery, wiring, engine control (EC) relay
16947	-	System voltage - high	Alternator, wiring
16952	-	Cruise control master/selector switch, SET signal - malfunction	Wiring, cruise control master/selector switch

16955	-	Stop lamp switch/brake pedal position (BPP) switch - circuit malfunction	Wiring, stop lamp switch, BPP switch
16983	-	CAN data bus - malfunction	Trouble code(s) stored in other system, wiring
16984	-	CAN data bus - malfunction	Trouble code(s) stored in other system, wiring
16985	-	Engine control module (ECM) - memory check sum error	ECM
16986	-	Engine control module (ECM)/transmission control module (TCM) - programming error	ECM/TCM
16987	-	Engine control module (ECM) - KAM error	ECM
16988	-	Engine control module (ECM) - RAM error	ECM
16989	-	Engine control module (ECM) - ROM error	ECM
16990	-	Engine control module (ECM) - PCM processor fault	ECM
17022	-	Throttle control unit, bank 1 - range/performance problem	Basic setting not carried out, throttle control unit, APP sensor
17026	-	Engine control module (ECM), knock control - defective	ECM
17029	-	AC system	Wiring, AC system
17034	-	Malfunction indicator lamp (MIL) - circuit malfunction	Wiring, MIL
17040	-	Instrument panel, fuel consumption signal - circuit malfunction	Wiring
17054	-	Glow plug control module - circuit malfunction	Wiring, poor connection, glow plug control module
17055	-	Glow plug, cylinder 1 - circuit malfunction	Wiring, poor connection, glow plug
17056	-	Glow plug, cylinder 2 - circuit malfunction	Wiring, poor connection, glow plug
17057	-	Glow plug, cylinder 3 - circuit malfunction	Wiring, poor connection, glow plug
17068	-	Glow plug control module - communication error	Wiring, poor connection, glow plug control module
17069	-	Engine control (EC) relay - open circuit	Wiring open circuit, engine control (EC) relay
17070	-	Engine control (EC) relay - short to earth	Wiring short to earth, engine control (EC) relay
17071	-	Engine control (EC) relay - short to earth	Wiring short to earth, engine control (EC) relay
17072	-	Engine control (EC) relay - short to positive	Wiring short to positive, engine control (EC) relay
17075	-	Engine coolant blower motor 1 - short to earth	Wiring short to earth, engine coolant blower motor
17076	-	Engine coolant blower motor 1 - short to positive	Wiring short to positive, engine coolant blower motor
17077	-	Engine coolant blower motor 2 - short to earth	Wiring short to earth, engine coolant blower motor
17078	-	Engine coolant blower motor 2 - short to positive	Wiring short to positive, engine coolant blower motor
17091	-	Transmission range (TR) sensor - low input	Wiring short to earth, TR sensor
17092	-	Transmission range (TR) sensor - high input	Wiring short to positive, TR sensor
-	P0, P2, U0	Refer to EOBD trouble code tables	-
17428	P1020	Fuel pressure - control limit exceeded	Wiring, fuel pressure sensor, fuel pressure control valve, high pressure fuel pump
17431	P1023	Fuel pressure control valve - short to earth	Wiring short to earth, fuel pressure control valve
17432	P1024	Fuel pressure control valve - open circuit	Wiring open circuit, fuel pressure control valve
17433	P1025	Fuel pressure control valve - mechanical fault	Fuel pressure control valve
17434	P1026	Intake manifold air control solenoid - short to positive	Wiring short to positive, intake manifold air control solenoid

17435	P1027	Intake manifold air control solenoid - short to earth	Wiring short to earth, intake manifold air control solenoid
17436	P1028	Intake manifold air control solenoid - open circuit	Wiring open circuit, intake manifold air control solenoid
17437	P1029	Intake manifold air control valve position sensor - upper limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17438	P1030	Intake manifold air control valve position sensor - lower limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17439	P1031	Intake manifold air control valve position sensor - specification not attained	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator, intake manifold air control solenoid
17440	P1032	Nitrogen oxides (NOx) sensor - signal too high	Catalytic converter, wiring short to positive, NOx sensor
17441	P1033	Nitrogen oxides (NOx) sensor - signal too low	Exhaust leak, wiring short to earth, NOx sensor
17442	P1034	Nitrogen oxides (NOx) sensor - signal outside tolerance	Catalytic converter, exhaust leak, wiring, NOx sensor
17443	P1035	Nitrogen oxides (NOx) sensor - range/performance problem	Wiring, heating inoperative, NOx sensor
17444	P1036	Nitrogen oxides (NOx) heater sensor - short to positive	Wiring short to positive, NOx sensor
17445	P1037	Nitrogen oxides (NOx) heater sensor - short to earth	Wiring short to earth, NOx sensor
17446	P1038	Nitrogen oxides (NOx) heater sensor - open circuit	Wiring open circuit, NOx sensor
17447	P1039	Injector 1, supply voltage - short circuit	Wiring, injector
17448	P1040	Injector 1, supply voltage - circuit malfunction	Wiring, injector
17449	P1041	Injector 2, supply voltage - short circuit	Wiring, injector
17450	P1042	Injector 2, supply voltage - circuit malfunction	Wiring, injector
17451	P1043	Injector 3, supply voltage - short circuit	Wiring, injector
17452	P1044	Injector 3, supply voltage - circuit malfunction	Wiring, injector
17453	P1045	Injector 4, supply voltage - short circuit	Wiring, injector
17454	P1046	Injector 4, supply voltage - circuit malfunction	Wiring, injector
17455	P1047	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - circuit malfunction	Wiring, camshaft position (CMP) actuator
17456	P1048	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - short to positive	Wiring short to positive, camshaft position (CMP) actuator
17457	P1049	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - short to earth	Wiring short to earth, camshaft position (CMP) actuator
17458	P1050	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 - open circuit	Wiring open circuit, camshaft position (CMP) actuator
17471	P1063	Fuel pressure - control limit not reached	Air in fuel system, fuel system leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17472	P1064	Fuel pressure - mechanical fault	Air in fuel system, fuel system leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17473	P1065	Fuel pressure - system deviation	Air in fuel system, fuel system leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17474	P1066	Intake manifold air control solenoid - short to positive	Wiring short to positive, intake manifold air control solenoid
17475	P1067	Intake manifold air control solenoid - short to earth	Wiring short to earth, intake manifold air control solenoid
17476	P1068	Intake manifold air control solenoid - open circuit	Wiring open circuit, intake manifold air control solenoid

17477	P1069	Nitrogen oxides (NOx) sensor, heater control - short to earth	Wiring short to earth, NOx sensor
17478	P1070	Nitrogen oxides (NOx) sensor, heater control - short to positive	Wiring short to positive, NOx sensor
17479	P1071	Nitrogen oxides (NOx) sensor, heater control - incorrect signal	Wiring, NOx sensor
17480	P1072	Nitrogen oxides (NOx) sensor, heater control - circuit malfunction	Wiring, NOx sensor
17501	P1093	Mixture control (MC), bank 1 - malfunction	Fuel pressure/pump, injector(s) intake leak
-	P1098	Intake manifold air control actuator position sensor - open circuit/short to positive	Wiring open circuit/short to positive, position sensor, ECM
-	P1100	Heated oxygen sensor (HO2S) 2, bank 1 - heater circuit low	Wiring, HO2S
17509	P1101	Heated oxygen sensor (HO2S) 1, bank 1 - low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17510	P1102	Heated oxygen sensor (HO2S) 1, bank 1 - heater short to positive	Wiring short to positive, HO2S
17511	P1103	Heated oxygen sensor (HO2S) 1, bank 1 - heater output too low	Wiring, HO2S
17513	P1105	Heated oxygen sensor (HO2S) 2, bank 1 - heater short to positive	Wiring short to positive, HO2S
17514	P1106	Heated oxygen sensor (HO2S) 1, bank 2 - low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17515	P1107	Heated oxygen sensor (HO2S) 1, bank 2 - heater short to positive	Wiring short to positive, HO2S
17518	P1110	Heated oxygen sensor (HO2S) 2, bank 2 - heater short to positive	Wiring short to positive, HO2S
17519	P1111	Heated oxygen sensor (HO2S) control, bank 1 - system too lean	Intake/exhaust leak, injector blocked, MAP sensor, MAF sensor, fuel pressure/pump, HO2S
17520	P1112	Heated oxygen sensor (HO2S) control, bank 1 - system too rich	Excessive fuel in engine oil, injector leaking, fuel pressure, EVAP canister purge valve, MAP sensor, MAF sensor, HO2S
17521	P1113	Heated oxygen sensor (HO2S) 1, bank 1 - heater resistance too high	Wiring, HO2S
17522	P1114	Heated oxygen sensor (HO2S) 2, bank 1 - heater resistance too high	Wiring, HO2S
17523	P1115	Heated oxygen sensor (HO2S) 1, bank 1 - heater short to earth	Wiring short to earth, HO2S
17524	P1116	Heated oxygen sensor (HO2S) 1, bank 1 - heater open circuit	Wiring open circuit, HO2S
17525	P1117	Heated oxygen sensor (HO2S) 2, bank 1 - heater short to earth	Wiring short to earth, HO2S
17526	P1118	Heated oxygen sensor (HO2S) 2, bank 1 - heater open circuit	Wiring open circuit, HO2S
17527	P1119	Heated oxygen sensor (HO2S) 1, bank 2 - heater short to earth	Wiring short to earth, HO2S
17528	P1120	Heated oxygen sensor (HO2S) 1, bank 2 - heater open circuit	Wiring open circuit, HO2S
17529	P1121	Heated oxygen sensor (HO2S) 2, bank 2 - heater short to earth	Wiring short to earth, HO2S
17530	P1122	Heated oxygen sensor (HO2S) 2, bank 2 - heater open circuit	Wiring open circuit, HO2S
17535	P1127	Long term fuel trim, entire speed/load range, bank 1 - system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s), HO2S
17536	P1128	Long term fuel trim, entire speed/load range, bank 1 - system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17537	P1129	Long term fuel trim, entire speed/load range, bank 2 - system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s)

17538	P1130	Long term fuel trim, entire speed/load range, bank 2 - system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17539	P1131	Heated oxygen sensor (HO2S) 1, bank 1 - heater resistance too high	Wiring, HO2S
17540	P1132	Heated oxygen sensor (HO2S) 1, bank 1 & 2 - heater control - circuit high	Wiring short to positive, HO2S
17541	P1133	Heated oxygen sensor (HO2S) 1, bank 1 & 2 - heater control - circuit low	Wiring open circuit/short to earth, HO2S
17544	P1136	Long term fuel trim, idling, bank 1 - system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17545	P1137	Long term fuel trim, idling, bank 1 - system too rich	Fuel pressure, injector(s), EVAP canister purge valve, HO2S
17546	P1138	Long term fuel trim, idling, bank 2 - system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17547	P1139	Long term fuel trim, idling, bank 2 - system too rich	Fuel pressure, injector(s), EVAP canister purge valve
17548	P1140	Heated oxygen sensor (HO2S) 2, bank 2 - heater resistance too high	Wiring, HO2S
17549	P1141	Load calculation - implausible value	Wiring, MAP sensor, MAF sensor
17550	P1142	Load calculation - too low	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17551	P1143	Load calculation - too high	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17552	P1144	Mass air flow (MAF) sensor, bank 1 - open circuit/short to earth	Wiring open circuit/short to earth, MAF sensor
17553	P1145	Mass air flow (MAF) sensor, bank 1 - short to positive	Wiring short to positive, MAF sensor
17554	P1146	Mass air flow (MAF) sensor, bank 1 - supply voltage	Operating voltage too high/low, wiring
17555	P1147	Heated oxygen sensor (HO2S) 1, bank 2 - lambda regulation, system too lean	Intake leak, wiring, HO2S
17556	P1148	Heated oxygen sensor (HO2S) 1, bank 2 - lambda regulation, system too rich	Exhaust leak, wiring, HO2S
17557	P1149	Heated oxygen sensor (HO2S) 1, bank 1 - implausible lambda control value	Exhaust leak, wiring, HO2S
17558	P1150	Heated oxygen sensor (HO2S) 1, bank 2 - implausible lambda control value	Exhaust leak, wiring, HO2S
17559	P1151	Long term fuel trim 1, bank 1 - below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, HO2S
17560	P1152	Long term fuel trim 2, bank 1 - below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, AIR system, HO2S
17561	P1153	Heated oxygen sensor (HO2S) 2, bank 1 & 2 - interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
17563	P1155	Manifold absolute pressure (MAP) sensor - short to positive	Wiring short to positive, MAP sensor
17564	P1156	Manifold absolute pressure (MAP) sensor - open circuit/short to earth	Wiring open circuit/short to earth, MAP sensor
17565	P1157	Manifold absolute pressure (MAP) sensor - supply voltage	Wiring, MAP sensor
17566	P1158	Manifold absolute pressure (MAP) sensor - range/performance problem	Wiring, hose connection(s), MAP sensor
17567	P1159	Mass air flow (MAF) sensor, bank 1 & 2 - implausible signal	EGR system, intake leak, wiring, MAF sensor 1/2
17568	P1160	Intake air temperature (IAT) sensor - short to earth	Wiring short to earth, IAT sensor
17569	P1161	Intake air temperature (IAT) sensor - open circuit/short to positive	Wiring open circuit/short to positive, IAT sensor
17570	P1162	Fuel temperature sensor - short to earth	Wiring short to earth, fuel temperature sensor
17571	P1163	Fuel temperature sensor - open circuit/short to positive	Wiring open circuit/short to positive, fuel temperature sensor

17572	P1164	Fuel temperature sensor - range/performance problem	Wiring, fuel temperature sensor
17573	P1165	Long term fuel trim 1, bank 1 - above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17574	P1166	Long term fuel trim 2, bank 1 - above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17575	P1167	Mass air flow (MAF) sensor, bank 2 - range/performance problem	Intake leak, wiring, MAF sensor
17576	P1168	Mass air flow (MAF) sensor, bank 2 - low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
17577	P1169	Mass air flow (MAF) sensor, bank 2 - high input	Wiring short to positive, earth wire defective, MAF sensor
17578	P1170	Mass air flow (MAF) sensor, bank 2 - supply voltage	Wiring, fuse, engine control (EC) relay, injector
17579	P1171	Throttle motor position sensor 2 - range/performance problem	Wiring, throttle valve tight/sticking, throttle motor position sensor
17580	P1172	Throttle motor position sensor 2 - low input	Wiring short to earth, throttle motor position sensor
17581	P1173	Throttle motor position sensor 2 - high input	Wiring short to positive, throttle motor position sensor
17582	P1174	Fuel measurement system, bank 1 - injection timing incorrect	Fuel pressure/pump, injector(s), intake/exhaust leak, EGR system, EVAP canister purge valve, HO2S
17584	P1176	Lambda correction after catalyst, bank 1 - control limit reached	Intake leak, HO2S, ECM
17585	P1177	Lambda correction after catalyst, bank 2 - control limit reached	Intake leak, HO2S
17586	P1178	Heated oxygen sensor (HO2S) 1, bank 1, pump current - open circuit	Wiring open circuit, HO2S
17587	P1179	Heated oxygen sensor (HO2S) 1, bank 1, pump current - short to earth	Wiring short to earth, HO2S
17588	P1180	Heated oxygen sensor (HO2S) 1, bank 1, pump current - short to positive	Wiring short to positive, HO2S
17589	P1181	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage - open circuit	Wiring open circuit, HO2S, HT leads, spark plugs, misfire detection
17590	P1182	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage - short to earth	Wiring short to earth, HO2S, HT leads, spark plugs, misfire detection
17591	P1183	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage - short to positive	Wiring short to positive, HO2S, HT leads, spark plugs, misfire detection
17592	P1184	Heated oxygen sensor (HO2S) 1, bank 1, common earth - open circuit	Wiring open circuit, HO2S, HT leads, spark plugs, misfire detection
17593	P1185	Heated oxygen sensor (HO2S) 1, bank 1, common earth - short to earth	Wiring short to earth, HO2S, HT leads, spark plugs, misfire detection
17594	P1186	Heated oxygen sensor (HO2S) 1, bank 1, common earth - short to positive	Wiring short to positive, HO2S, HT leads, spark plugs, misfire detection
17595	P1187	Heated oxygen sensor (HO2S) 1, bank 1 or 2 - circuit malfunction	Wiring, HO2S
17598	P1190	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage - range/performance problem	Wiring, HO2S, HT leads, spark plugs, misfire detection
17599	P1191	Heated oxygen sensor (HO2S) 1, bank 1 & 2 - interchanged	HO2S 1 on banks 1 & 2 incorrectly installed
17600	P1192	Fuel pressure sensor - supply voltage	Wiring, fuel pressure sensor
17601	P1193	Fuel pressure sensor - open circuit/short to positive	Wiring open circuit/short to positive
17602	P1194	Fuel pressure control valve - short to positive	Wiring short to positive, fuel pressure control valve
17603	P1195	Fuel pressure control valve - open circuit/short to earth	Wiring open circuit/short to earth, fuel pressure control valve

17604	P1196	Heated oxygen sensor (HO2S) 1, bank 1, heater circuit malfunction	Wiring, HO2S
17605	P1197	Heated oxygen sensor (HO2S) 1, bank 2, heater circuit malfunction	Wiring, HO2S
17606	P1198	Heated oxygen sensor (HO2S) 2, bank 1, heater circuit malfunction	Wiring, HO2S
17607	P1199	Heated oxygen sensor (HO2S) 2, bank 2, heater circuit malfunction	Wiring, HO2S
-	P12A1	Fuel rail pressure (FRP) sensor - signal low	Wiring, FRP sensor, ECM
-	P12A2	Fuel rail pressure (FRP) sensor - signal high	Wiring, FRP sensor, ECM
-	P12A3	Fuel pressure regulator control solenoid - solenoid stuck open	Wiring, fuel pressure regulator control solenoid, ECM
-	P12A4	Fuel pressure regulator control solenoid - solenoid stuck closed	Wiring, fuel pressure regulator control solenoid, ECM
17608	P1200	Turbocharger (TC) bypass valve/turbocharger (TC) intake divert valve - malfunction	TC bypass valve/TC intake divert valve, mechanical fault
17609	P1201	Injector 1 - circuit malfunction	Wiring, injector
17610	P1202	Injector 2 - circuit malfunction	Wiring, injector
17611	P1203	Injector 3 - circuit malfunction	Wiring, injector
17612	P1204	Injector 4 - circuit malfunction	Wiring, injector
17613	P1205	Injector 5 - circuit malfunction	Wiring, injector
17614	P1206	Injector 6 - circuit malfunction	Wiring, injector
17615	P1207	Injector 7 - circuit malfunction	Wiring, injector
17616	P1208	Injector 8 - circuit malfunction	Wiring, injector
17621	P1213	Injector 1 - short to positive	Wiring short to positive, injector
17622	P1214	Injector 2 - short to positive	Wiring short to positive, injector
17623	P1215	Injector 3 - short to positive	Wiring short to positive, injector
17624	P1216	Injector 4 - short to positive	Wiring short to positive, injector
17625	P1217	Injector 5 - short to positive	Wiring short to positive, injector
17626	P1218	Injector 6 - short to positive	Wiring short to positive, injector
17627	P1219	Injector 7 - short to positive	Wiring short to positive, injector
17628	P1220	Injector 8 - short to positive	Wiring short to positive, injector
17633	P1225	Injector 1 - short to earth	Wiring short to earth, injector
17634	P1226	Injector 2 - short to earth	Wiring short to earth, injector
17635	P1227	Injector 3 - short to earth	Wiring short to earth, injector
17636	P1228	Injector 4 - short to earth	Wiring short to earth, injector
17637	P1229	Injector 5 - short to earth	Wiring short to earth, injector
17638	P1230	Injector 6 - short to earth	Wiring short to earth, injector
17639	P1231	Injector 7 - short to earth	Wiring short to earth, injector
17640	P1232	Injector 8 - short to earth	Wiring short to earth, injector
17645	P1237	Injector 1 - open circuit	Wiring open circuit, injector
17646	P1238	Injector 2 - open circuit	Wiring open circuit, injector
17647	P1239	Injector 3 - open circuit	Wiring open circuit, injector
17648	P1240	Injector 4 - open circuit	Wiring open circuit, injector
17649	P1241	Injector 5 - open circuit	Wiring open circuit, injector
17650	P1242	Injector 6 - open circuit	Wiring open circuit, injector
17651	P1243	Injector 7 - open circuit	Wiring open circuit, injector
17652	P1244	Injector 8 - open circuit	Wiring open circuit, injector
17653	P1245	Injector needle lift sensor - short to earth	Wiring short to earth, injector needle lift sensor
17654	P1246	Injector needle lift sensor - range/performance problem	Injector needle lift sensor, injector pipe defective, fuel level low

17655	P1247	Injector needle lift sensor - open circuit/short to positive	Wiring open circuit/short to positive, injector needle lift sensor
17656	P1248	Start of injection - control difference	Fuel injection timing solenoid, injector needle lift sensor, fuel level low, pump timing
17658	P1250	Fuel tank level sensor - low input	Fuel level too low
17659	P1251	Fuel injection timing solenoid - short to positive	Wiring short to positive
17660	P1252	Fuel injection timing solenoid - open circuit/short to earth	Wiring open circuit/short to earth, fuel injection timing solenoid
17661	P1253	Instrument panel, fuel consumption signal - short to earth	Wiring short to earth, instrument panel
17662	P1254	Instrument panel, fuel consumption signal - short to positive	Wiring short to positive, instrument panel
17663	P1255	Engine coolant temperature (ECT) sensor - short to earth	Wiring short to earth, ECT sensor
17664	P1256	Engine coolant temperature (ECT) sensor - open circuit/short to positive	Wiring open circuit/short to positive, ECT sensor
17668	P1260	Injector 1 - implausible signal	No control
17669	P1261	Injector 1 - control limit exceeded	Control period too long, wiring, injector
17670	P1262	Injector 1 - control limit malfunction	Fuel level low, air in fuel system, wiring, injector, ECM
17671	P1263	Injector 2 - implausible signal	No control, wiring, injector, ECM
17672	P1264	Injector 2 - control limit exceeded	Control period too long, wiring, injector, ECM
17673	P1265	Injector 2 - control limit malfunction	Fuel level low, air in fuel system, wiring, injector, ECM
17674	P1266	Injector 3 - implausible signal	No control, wiring, injector, ECM
17675	P1267	Injector 3 - control limit exceeded	Control period too long, wiring, injector, ECM
17676	P1268	Injector 3 - control limit malfunction	Fuel level low, air in fuel system, wiring, injector, ECM
17677	P1269	Injector 4 - implausible signal	No control, wiring, injector, ECM
17678	P1270	Injector 4 - control limit exceeded	Control period too long, wiring, injector, ECM
17679	P1271	Injector 4 - control limit malfunction	Fuel level low, air in fuel system, wiring, injector, ECM
17686	P1278	Fuel metering solenoid - short to positive	Wiring short to positive, fuel metering solenoid
17687	P1279	Fuel metering solenoid - open circuit/short to earth	Wiring open circuit/short to earth, fuel metering solenoid
17689	P1281	Fuel metering solenoid - short to earth	Wiring short to earth, fuel metering solenoid
17690	P1282	Fuel metering solenoid - open circuit	Wiring open circuit, fuel metering solenoid
17695	P1287	Turbocharger (TC) bypass valve/turbocharger (TC) intake divert valve - open circuit	Wiring open circuit, TC bypass valve/TC intake divert valve
17696	P1288	Turbocharger (TC) bypass valve/turbocharger (TC) intake divert valve - short to positive	Wiring short to positive, TC bypass valve/TC intake divert valve
17697	P1289	Turbocharger (TC) bypass valve/turbocharger (TC) intake divert valve - short to earth	Wiring short to earth, TC bypass valve/TC intake divert valve
17698	P1290	Engine coolant temperature (ECT) sensor, ECM controlled cooling system - high input	Wiring, ECT sensor
17699	P1291	Engine coolant temperature (ECT) sensor, ECM controlled cooling system - high input	Wiring, ECT sensor
17700	P1292	Engine coolant thermostat - open circuit	Wiring open circuit, engine coolant thermostat
17701	P1293	Engine coolant thermostat - short to positive	Wiring short to positive, engine coolant thermostat
17702	P1294	Engine coolant thermostat - short to earth	Wiring short to earth, engine coolant thermostat
17703	P1295	Turbocharger (TC), bypass - flow malfunction	TC wastegate regulating valve, hose connection(s), injector
17704	P1296	Engine cooling system - malfunction	ECT sensor, engine coolant thermostat

17705	P1297	Turbocharger (TC)/throttle valve, hose connection - pressure loss	Hose connection
17707	P1299	Fuel metering solenoid - circuit malfunction	Wiring, fuel metering solenoid
17708	P1300	Random/multiple cylinder(s) - misfire detected	Fuel level low, fuel gauge tank sensor
17733	P1325	Knock control, cylinder 1 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17734	P1326	Knock control, cylinder 2 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17735	P1327	Knock control, cylinder 3 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17736	P1328	Knock control, cylinder 4 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17737	P1329	Knock control, cylinder 5 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17738	P1330	Knock control, cylinder 6 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17739	P1331	Knock control, cylinder 7 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17740	P1332	Knock control, cylinder 8 - control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17743	P1335	Engine torque control - limit reached	Throttle control unit, hose(s), TC system, MAP sensor, IAT sensor, MAF sensor, ECT sensor
17744	P1336	Engine torque monitoring - control limit exceeded	Hose(s), TC system, throttle control unit, IAT sensor, MAP sensor, MAF sensor, ECT sensor, APP sensor
17745	P1337	Camshaft position (CMP) sensor, bank 1 - short to earth	Wiring short to earth, CMP sensor
17746	P1338	Camshaft position (CMP) sensor, bank 1 - circuit malfunction	Wiring, CMP sensor
17747	P1339	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - interchanged	Multi-plugs incorrectly connected
17748	P1340	Camshaft position (CMP) sensor 1/bank 1/crankshaft position (CKP) sensor - out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor
17749	P1341	Ignition amplifier, primary circuit 1 - short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17750	P1342	Ignition amplifier, primary circuit 1 - short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17751	P1343	Ignition amplifier, primary circuit 2 - short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17752	P1344	Ignition amplifier, primary circuit 2 - short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17753	P1345	Ignition amplifier, primary circuit 3 - short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17754	P1346	Ignition amplifier, primary circuit 3 - short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17755	P1347	Camshaft position (CMP) sensor 2/bank 2/crankshaft position (CKP) sensor - out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor

17756	P1348	Ignition amplifier, primary circuit 1 - open circuit	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17757	P1349	Ignition amplifier, primary circuit 2 - open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17758	P1350	Ignition amplifier, primary circuit 3 - open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17759	P1351	Camshaft position (CMP) sensor, bank 1 - range/performance problem	Ignore trouble code, erase fault memory
17762	P1354	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
17763	P1355	Ignition coil/amplifier, cylinder 1 - open circuit	Wiring open circuit, ignition coil/amplifier
17764	P1356	Ignition coil/amplifier, cylinder 1 - short to positive	Wiring short to positive, ignition coil/amplifier
17765	P1357	Ignition coil/amplifier, cylinder 1 - short to earth	Wiring short to earth, ignition coil/amplifier
17766	P1358	Ignition coil/amplifier, cylinder 2 - open circuit	Wiring open circuit, ignition coil/amplifier
17767	P1359	Ignition coil/amplifier, cylinder 2 - short to positive	Wiring short to positive, ignition coil/amplifier
17768	P1360	Ignition coil/amplifier, cylinder 2 - short to earth	Wiring short to earth, ignition coil/amplifier
17769	P1361	Ignition coil/amplifier, cylinder 3 - open circuit	Wiring open circuit, ignition coil/amplifier
17770	P1362	Ignition coil/amplifier, cylinder 3 - short to positive	Wiring short to positive, ignition coil/amplifier
17771	P1363	Ignition coil/amplifier, cylinder 3 - short to earth	Wiring short to earth, ignition coil/amplifier
17772	P1364	Ignition coil/amplifier, cylinder 4 - open circuit	Wiring open circuit, ignition coil/amplifier
17773	P1365	Ignition coil/amplifier, cylinder 4 - short to positive	Wiring short to positive, ignition coil/amplifier
17774	P1366	Ignition coil/amplifier, cylinder 4 - short to earth	Wiring short to earth, ignition coil/amplifier
17775	P1367	Ignition coil/amplifier, cylinder 5 - open circuit	Wiring open circuit, ignition coil/amplifier
17776	P1368	Ignition coil/amplifier, cylinder 5 - short to positive	Wiring short to positive, ignition coil/amplifier
17777	P1369	Ignition coil/amplifier, cylinder 5 - short to earth	Wiring short to earth, ignition coil/amplifier
17778	P1370	Ignition coil/amplifier, cylinder 6 - open circuit	Wiring open circuit, ignition coil/amplifier
17779	P1371	Ignition coil/amplifier, cylinder 6 - short to positive	Wiring short to positive, ignition coil/amplifier
17780	P1372	Ignition coil/amplifier, cylinder 6 - short to earth	Wiring short to earth, ignition coil/amplifier
17781	P1373	Ignition coil/amplifier, cylinder 7 - open circuit	Wiring open circuit, ignition coil/amplifier
17782	P1374	Ignition coil/amplifier, cylinder 7 - short to positive	Wiring short to positive, ignition coil/amplifier
17783	P1375	Ignition coil/amplifier, cylinder 7 - short to earth	Wiring short to earth, ignition coil/amplifier
17784	P1376	Ignition coil/amplifier, cylinder 8 - open circuit	Wiring open circuit, ignition coil/amplifier
17785	P1377	Ignition coil/amplifier, cylinder 8 - short to positive	Wiring short to positive, ignition coil/amplifier
17786	P1378	Ignition coil/amplifier, cylinder 8 - short to earth	Wiring short to earth, ignition coil/amplifier
17793	P1385	Engine control module (ECM) - defective	ECM

17794	P1386	Engine control module (ECM) - defective	ECM
17795	P1387	Engine control module (ECM) - defective	ECM
17796	P1388	Engine control module (ECM) - defective	ECM
17797	P1389	Engine control module (ECM) 2 - defective	ECM
17799	P1391	Camshaft position (CMP) sensor 2/bank 2 - short to earth	Wiring short to earth, CMP sensor
17800	P1392	Camshaft position (CMP) sensor 2/bank 2 - open circuit/short to positive	Wiring open circuit/short to positive, CMP sensor
17801	P1393	Ignition amplifier, primary circuit 1 - circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17802	P1394	Ignition amplifier, primary circuit 2 - circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17803	P1395	Ignition amplifier, primary circuit 3 - circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17805	P1397	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - control limit reached	Insecure/damaged rotor, CKP/RPM sensor
17806	P1398	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - short to earth	Wiring short to earth, CKP/RPM sensor
17807	P1399	Crankshaft position (CKP) sensor/engine speed (RPM) sensor - short to positive	Wiring short to positive, CKP/RPM sensor
17808	P1400	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 - circuit malfunction	Wiring, EGR valve
17809	P1401	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 - short to earth	Wiring short to earth, EGR valve
17810	P1402	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 - short to positive	Wiring short to positive, EGR valve/solenoid
17811	P1403	Exhaust gas recirculation (EGR) system - control difference	Basic setting not carried out, EGR system
17812	P1404	Exhaust gas recirculation (EGR) system - basic setting	Basic setting not carried out, EGR system
17815	P1407	Exhaust gas recirculation temperature (EGRT) sensor - low input	Wiring short to earth, EGRT sensor
17816	P1408	Exhaust gas recirculation temperature (EGRT) sensor - high input	Wiring short to positive, earth wire defective, EGRT sensor
17817	P1409	Evaporative emission (EVAP) canister purge valve - circuit malfunction	Wiring, EVAP canister purge valve
17818	P1410	Evaporative emission (EVAP) canister purge valve - short to positive	Wiring short to positive, EVAP canister purge valve
17819	P1411	Secondary air injection (AIR) system, bank 2 - insufficient flow detected	Intake leak, hose(s) blocked/leaking, AIR valve/solenoid
17822	P1414	Secondary air injection (AIR) system, bank 2 - leak detected	Intake leak, hose(s) leaking, AIR valve/solenoid
17823	P1415	Exhaust gas recirculation (EGR) valve position sensor - lower limit exceeded	Basic setting not carried out
17824	P1416	Exhaust gas recirculation (EGR) valve position sensor - upper limit exceeded	Basic setting not carried out
17828	P1420	Secondary air injection (AIR) valve/solenoid - circuit malfunction	Wiring, AIR solenoid
17829	P1421	Secondary air injection (AIR) valve/solenoid - short to earth	Wiring short to earth, AIR valve/solenoid
17830	P1422	Secondary air injection (AIR) valve/solenoid - short to positive	Wiring short to positive, AIR valve/solenoid
17831	P1423	Secondary air injection (AIR) system, bank 1 - insufficient flow detected	Hose connection(s), AIR valve/solenoid
17832	P1424	Secondary air injection (AIR) system, bank 1 - leak detected	AIR valve, exhaust leak

17833	P1425	Evaporative emission (EVAP) canister purge valve - short to earth	Wiring short to earth, EVAP canister purge valve
17834	P1426	Evaporative emission (EVAP) canister purge valve - open circuit	Wiring open circuit, EVAP canister purge valve
17835	P1427	Vacuum pump, brakes - short to positive	Wiring short to positive, vacuum pump
17836	P1428	Vacuum pump, brakes - short to earth	Wiring short to earth, vacuum pump
17837	P1429	Vacuum pump, brakes - open circuit	Wiring open circuit, vacuum pump
17838	P1430	Vacuum pump, brakes - open circuit/short to positive	Wiring open circuit/short to positive, vacuum pump
17839	P1431	Vacuum pump, brakes - open circuit/short to earth	Wiring open circuit/short to earth, vacuum pump
17840	P1432	Secondary air injection (AIR) valve/solenoid - open circuit	Wiring open circuit, fuse, AIR valve/solenoid
17841	P1433	Secondary air injection (AIR) pump relay - open circuit	Wiring open circuit, fuse, AIR pump relay
17842	P1434	Secondary air injection (AIR) pump relay - short to positive	Wiring short to positive, AIR pump relay
17843	P1435	Secondary air injection (AIR) pump relay - short to earth	Wiring short to earth, AIR pump relay
17844	P1436	Secondary air injection (AIR) pump relay - circuit malfunction	Wiring, AIR pump relay
17845	P1437	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 - short to positive	Wiring short to positive, EGR valve/solenoid
17846	P1438	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 - open circuit/short to earth	Wiring open circuit/short to earth, EGR valve/solenoid
17847	P1439	Exhaust gas recirculation (EGR) valve position sensor - basic setting	Basic setting not carried out, EGR system
17848	P1440	Exhaust gas recirculation (EGR) valve - open circuit	Wiring open circuit, EGR valve
17849	P1441	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 - open circuit/short to earth	Wiring open circuit/short to earth, EGR solenoid
17850	P1442	Exhaust gas recirculation (EGR) valve position sensor - high input	Wiring short to positive, EGR valve position sensor
17851	P1443	Exhaust gas recirculation (EGR) valve position sensor - low input	Wiring short to earth, EGR valve position sensor
17852	P1444	Exhaust gas recirculation (EGR) valve position sensor - range/performance problem	Wiring, EGR valve position sensor
17858	P1450	Secondary air injection (AIR) system - short to positive	Wiring short to positive, AIR relay
17859	P1451	Secondary air injection (AIR) system - short to earth	Wiring short to earth, AIR relay
17860	P1452	Secondary air injection (AIR) system - open circuit	Wiring open circuit, AIR relay
17861	P1453	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 - open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17862	P1454	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 - short to earth	Wiring short to earth, EGRT sensor
17863	P1455	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 - range/performance problem	Exhaust leak, wiring, EGRT sensor
17864	P1456	Exhaust gas recirculation temperature (EGRT) control, bank 1 - control limit reached	EGRT sensor

17865	P1457	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 - open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17866	P1458	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 - short to earth	Wiring short to earth, EGRT sensor
17867	P1459	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 - range/performance problem	Exhaust leak, wiring, EGRT sensor
17868	P1460	Exhaust gas recirculation temperature (EGRT) control, bank 2 - control limit reached	EGRT sensor
17869	P1461	Exhaust gas recirculation temperature (EGRT) control, bank 1 - range/performance problem	Exhaust leak/blockage, EGRT sensor
17870	P1462	Exhaust gas recirculation temperature (EGRT) control, bank 2 - range/performance problem	Exhaust leak/blockage, EGRT sensor
17878	P1470	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - circuit malfunction	Wiring, EVAP leak detection pump
17879	P1471	Evaporative emission (EVAP) leak detection pump - short to positive	Wiring short to positive, EVAP leak detection pump
17880	P1472	Evaporative emission (EVAP) leak detection pump - short to earth	Wiring short to earth, EVAP leak detection pump
17881	P1473	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - wiring open circuit	Wiring open circuit, EVAP canister purge valve, EVAP leak detection pump
17883	P1475	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - no signal	Wiring, EVAP canister purge valve, EVAP leak detection pump
17884	P1476	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - vacuum too low	System leak, hose blockage, EVAP canister, EVAP leak detection pump
17885	P1477	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - malfunction	Wiring, hose leak/blockage, EVAP canister purge valve, EVAP canister, EVAP leak detection pump
17886	P1478	Evaporative emission (EVAP) leak detection pump/fuel tank vent system - blockage detected	Hose blockage
17887	P1479	Vacuum system, brakes - mechanical fault	Vacuum pump
-	P1495	Exhaust gas recirculation (EGR) cooler bypass valve - open circuit/short to earth	Wiring open circuit/short to earth, EGR cooler bypass valve, ECM
-	P1496	Exhaust gas recirculation (EGR) cooler bypass valve - short to positive	Wiring short to positive, EGR cooler bypass valve, ECM
17908	P1500	Fuel pump relay - circuit malfunction	Wiring, fuel pump relay
17909	P1501	Fuel pump relay - short to earth	Wiring short to earth, fuel pump relay
17910	P1502	Fuel pump relay - short to positive	Wiring short to positive, fuel pump relay
17911	P1503	Alternator load signal	Wiring, alternator
17912	P1504	Intake system - leak detected	Intake leak, EGR system, EVAP system, hose connection(s), throttle control unit
17913	P1505	Closed throttle position (CTP) switch - does not close	Throttle cable/valve, wiring open circuit/short to positive, CTP switch adjustment/defective, ECM
17914	P1506	Closed throttle position (CTP) switch - does not open	Moisture ingress, wiring short to earth, CTP switch adjustment/defective, ECM
17915	P1507	Idle speed control (ISC) - lower limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals
17916	P1508	Idle speed control (ISC) - upper limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals

17917	P1509	Idle air control (IAC) valve - circuit malfunction	Wiring, IAC valve
17918	P1510	Idle air control (IAC) valve - short to positive	Wiring open circuit/short to positive, IAC valve
17919	P1511	Intake manifold air control solenoid 1 - current circuit	Wiring, intake manifold air control solenoid
17920	P1512	Intake manifold air control solenoid 1 - short to positive	Wiring short to positive, intake manifold air control solenoid
17921	P1513	Intake manifold air control solenoid 2 - short to positive	Wiring short to positive, intake manifold air control solenoid
17922	P1514	Intake manifold air control solenoid 2 - short to earth	Wiring short to earth, intake manifold air control solenoid
17923	P1515	Intake manifold air control solenoid 1 - short to earth	Wiring short to earth, intake manifold air control solenoid
17924	P1516	Intake manifold air control solenoid 1 - open circuit	Wiring open circuit, intake manifold air control solenoid
17925	P1517	Engine control (EC) relay - circuit malfunction	Wiring, engine control (EC) relay
17926	P1518	Engine control (EC) relay - short to positive	Wiring short to positive, engine control (EC) relay
17927	P1519	Camshaft position (CMP) control, bank 1 - malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective
17928	P1520	Intake manifold air control solenoid 2 - open circuit	Wiring open circuit, intake manifold air control solenoid
17930	P1522	Camshaft position (CMP) control, bank 2 - malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective
17931	P1523	SRS crash signal received	Airbag triggered
17932	P1524	Fuel pump relay - open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
17933	P1525	Camshaft position (CMP) actuator, bank 1 - circuit malfunction	Wiring, CMP actuator
17934	P1526	Camshaft position (CMP) actuator, bank 1 - short to positive	Wiring short to positive, CMP actuator
17935	P1527	Camshaft position (CMP) actuator, bank 1 - short to earth	Wiring short to earth, CMP actuator
17936	P1528	Camshaft position (CMP) actuator, bank 1 - open circuit	Wiring open circuit, CMP actuator
17937	P1529	Camshaft position (CMP) actuator - short to positive	Wiring short to positive, CMP actuator
17938	P1530	Camshaft position (CMP) actuator - short to earth	Wiring short to earth, CMP actuator
17939	P1531	Camshaft position (CMP) actuator - open circuit	Wiring open circuit, CMP actuator
17940	P1532	Idle control - lean running speed below specification	Throttle control unit
17941	P1533	Camshaft position (CMP) actuator, bank 2 - circuit malfunction	Wiring, CMP actuator
17942	P1534	Camshaft position (CMP) actuator, bank 2 - short to positive	Wiring short to positive, CMP actuator
17943	P1535	Camshaft position (CMP) actuator, bank 2 - short to earth	Wiring short to earth, CMP actuator
17944	P1536	Camshaft position (CMP) actuator, bank 2 - open circuit	Wiring open circuit, CMP actuator
17945	P1537	Fuel shut-off solenoid - malfunction	Fuel shut-off solenoid (leaking/sticking)
17946	P1538	Fuel shut-off solenoid - open circuit/short to earth	Wiring open circuit/short to earth, fuel shut-off solenoid
17947	P1539	Clutch pedal position (CPP) switch - range/performance problem	Wiring, CPP switch

17948	P1540	Vehicle speed signal - high input	Excessive vehicle speed, instrument panel defective
17949	P1541	Fuel pump relay - open circuit	Wiring open circuit, fuel pump relay
17950	P1542	Throttle motor position sensor 1 - range/performance problem	Throttle valve requires cleaning, wiring, throttle motor position sensor
17951	P1543	Throttle motor position sensor 1 - low input	Wiring short to earth, throttle motor position sensor
17952	P1544	Throttle motor position sensor 1 - high input	Wiring short to positive, throttle motor position sensor
17953	P1545	Throttle valve control - malfunction	Throttle valve tight/sticking, wiring, throttle control unit
17954	P1546	Turbocharger (TC) wastegate regulating valve - short to positive	Wiring short to positive, TC wastegate regulating valve
17955	P1547	Turbocharger (TC) wastegate regulating valve - short to earth	Wiring short to earth, TC wastegate regulating valve
17956	P1548	Turbocharger (TC) wastegate regulating valve - open circuit	Wiring open circuit, TC wastegate regulating valve
17957	P1549	Turbocharger (TC) wastegate regulating valve - open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
17958	P1550	Turbocharger (TC) pressure - control difference	Intake/exhaust leak, hoses interchanged/not connected, MAP sensor, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17961	P1553	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor - range/performance problem	Intake/exhaust leak, EGR system, EVAP canister purge valve, throttle control unit, wiring, MAP sensor, BARO sensor
17962	P1554	Throttle control unit - basic setting conditions	Basic setting conditions not met
17963	P1555	Turbocharger (TC) pressure - upper limit exceeded	Hoses interchanged/not connected, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17964	P1556	Turbocharger (TC) pressure - control limit not reached	TC wastegate regulating valve, intake leak, TC defective
17965	P1557	Turbocharger (TC) pressure - control limit exceeded	Hose connection interchanged/not connected, TC boost pressure sensor, TC wastegate regulating valve
17966	P1558	Idle speed control (ISC) actuator/throttle motor - circuit malfunction	Wiring, ISC actuator/throttle motor, throttle control unit
17967	P1559	Throttle control unit - basic setting malfunction	Accelerator pedal or starter motor operated during basic setting
17968	P1560	Maximum engine RPM exceeded	Incorrect gear shift, wiring open circuit, CKP/RPM sensor
17969	P1561	Fuel quantity adjuster - control difference	Wiring, fuel injection pump
17970	P1562	Fuel quantity adjuster - upper stop value	Fuel quantity adjuster blocked/defective, stop value reached
17971	P1563	Fuel quantity adjuster - lower stop value	Fuel quantity adjuster blocked/defective, lower stop value reached
17972	P1564	Throttle control unit - voltage low during basic setting	Battery, wiring
17973	P1565	Throttle control unit - lower stop not reached	Throttle valve tight/sticking, ISC actuator
17974	P1566	AC compressor, load signal - implausible signal	Wiring, AC system
17976	P1568	Throttle control unit - mechanical fault	Throttle valve tight/sticking
17977	P1569	Cruise control master switch	Wiring, cruise control master switch
17978	P1570	Engine control module (ECM) - immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
17979	P1571	Engine mounting control solenoid, bank 2 - short to positive	Wiring short to positive, engine mounting control solenoid
17980	P1572	Engine mounting control solenoid, bank 2 - short to earth	Wiring short to earth, engine mounting control solenoid
17981	P1573	Engine mounting control solenoid, bank 2 - open circuit	Wiring open circuit, engine mounting control solenoid

17983	P1575	Engine mounting control solenoid, bank 1 - short to positive	Wiring short to positive, engine mounting control solenoid
17984	P1576	Engine mounting control solenoid, bank 1 - short to earth	Wiring short to earth, engine mounting control solenoid
17985	P1577	Engine mounting control solenoid, bank 1 - open circuit	Wiring open circuit, engine mounting control solenoid
17987	P1579	Throttle control unit - basic setting	Basic setting not carried out
17988	P1580	Throttle motor, bank 1 - circuit malfunction	Wiring, throttle motor
17989	P1581	Throttle control unit - basic setting	Basic setting not carried out
17990	P1582	Idle speed adaptation - limit reached	Intake/exhaust leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve
17993	P1585	Throttle control unit - lower stop not reached	Throttle motor, throttle control unit
17994	P1586	Engine mounting control solenoid, bank 1 & 2 - short to positive	Wiring short to positive, engine mounting control solenoid
17997	P1589	AC/heater air temperature control switch - short to earth	Wiring short to earth, AC/heater air temperature control switch
17998	P1590	AC/heater air temperature control switch - open circuit	Wiring open circuit, AC/heater air temperature control switch
18000	P1592	Barometric pressure (BARO) sensor/manifold absolute pressure (MAP) sensor - implausible signal	TC system, MAP sensor
18001	P1593	Altitude adaption - signal outside tolerance	Intake leak, MAF sensor, throttle control unit
18007	P1599	Idle control - lean running speed below specification	IAC valve
18008	P1600	Engine control module (ECM) - supply voltage low from ignition switch	Battery, alternator, wiring open circuit
18009	P1601	Engine control module (ECM) - supply voltage	Wiring, engine control (EC) relay
18010	P1602	Engine control module (ECM) - supply voltage low from battery	Battery was disconnected, battery discharged, alternator, wiring open circuit, fuse
18011	P1603	Engine control module (ECM) - defective	ECM
18012	P1604	Engine control module (ECM) - defective	ECM
18014	P1606	Rough road signal - circuit malfunction	ABS control module trouble code(s) stored, wiring, CAN data bus
18016	P1608	Power steering pressure (PSP) switch - circuit malfunction	Wiring, PSP switch
18017	P1609	Engine control module (ECM) - crash switch-off triggered	Airbag triggered
-	P161A	Glow plug 1 - circuit malfunction	Wiring, glow plug, glow plug control module
-	P161B	Glow plug 2 - circuit malfunction	Wiring, glow plug, glow plug control module
-	P161C	Glow plug 3 - circuit malfunction	Wiring, glow plug, glow plug control module
-	P161D	Glow plug 4 - circuit malfunction	Wiring, glow plug, glow plug control module
18018	P1610	Engine control module (ECM) - defective	ECM
18019	P1611	Malfunction indicator lamp (MIL) - short to earth	Wiring short to earth
18020	P1612	Engine control module (ECM) - coding	Incorrectly coded
18021	P1613	Malfunction indicator lamp (MIL) - open circuit/short to positive	Wiring open circuit/short to positive
18023	P1615	Engine oil temperature (EOT) sensor - range/performance problem	Engine oil level, wiring, EOT sensor
18024	P1616	Glow plug warning lamp - short to positive	Wiring short to positive
18025	P1617	Glow plug warning lamp - open circuit/short to earth	Bulb, wiring open circuit/short to earth
18026	P1618	Glow plug relay - short to positive	Wiring short to positive, glow plug relay
18027	P1619	Glow plug relay - open circuit/short to earth	Wiring open circuit/short to earth, glow plug relay

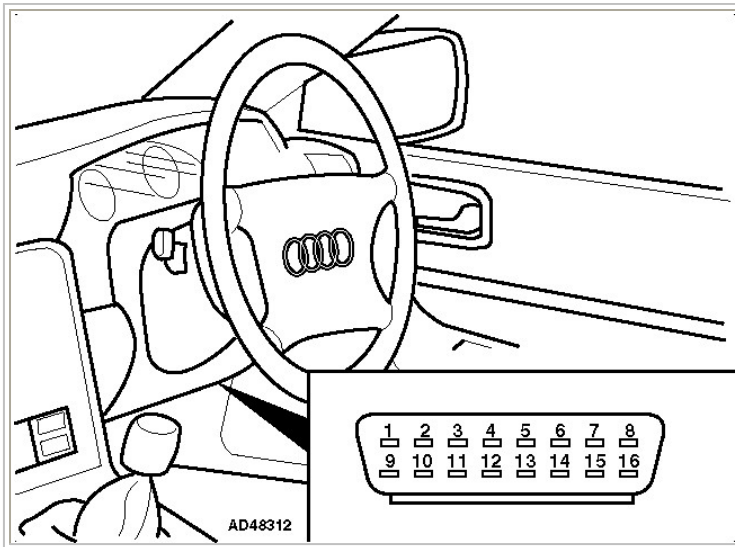
18028	P1620	Instrument panel, ECT signal - open circuit/short to positive	Wiring open circuit/short to positive, instrument panel
18029	P1621	Instrument panel, ECT signal - short to earth	Wiring short to earth, instrument panel
18030	P1622	Instrument panel, ECT signal - implausible signal	Wiring, instrument panel, ECT sensor
18031	P1623	CAN data bus - no signal	Trouble code(s) stored in other system(s), wiring, matching resistor in ECM
18032	P1624	Malfunction indicator lamp (MIL) - request signal active	Trouble code(s) stored in other system(s)
18033	P1625	CAN data bus, TCM - incorrect signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
18034	P1626	CAN data bus, TCM - no signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
-	P1628	CAN data bus, steering position sensor - no signal	Wiring, steering position sensor, ABS fault
18037	P1629	CAN data bus, cruise control - no signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM
18038	P1630	Accelerator pedal position (APP) sensor 1 - low input	Wiring short to earth, APP sensor, TP sensor
18039	P1631	Accelerator pedal position (APP) sensor 1 - high input	Wiring short to positive, APP sensor, TP sensor
18040	P1632	Accelerator pedal position (APP) sensor - supply voltage	Operating voltage too high/low, wiring
18041	P1633	Accelerator pedal position (APP) sensor 2 - low input	Wiring short to earth, APP sensor
18042	P1634	Accelerator pedal position (APP) sensor 2 - high input	Wiring short to positive, APP sensor
18043	P1635	CAN data bus, AC - no signal	AC control module trouble code(s) stored, wiring, matching resistor in ECM
18044	P1636	CAN data bus, SRS - no signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
18045	P1637	CAN data bus, electronic CE - no signal	Trouble code(s) stored, wiring, matching resistor in ECM
18047	P1639	Accelerator pedal position (APP) sensor 1/2 - range/performance problem	Wiring, APP sensor, TP sensor
18048	P1640	Engine control module (ECM) - defective	ECM
-	P1641	AC control module	Trouble code(s) stored
18050	P1642	SRS control module - system malfunction	Trouble code(s) stored
-	P1643	Multifunction control module	Trouble code(s) stored
18053	P1645	CAN data bus, 4WD - no signal	4WD trouble code(s) stored, wiring, matching resistor in ECM
-	P1647	CAN data bus, ECM/TCM coding	ECM/TCM incorrectly coded
18056	P1648	CAN data bus - defective	Wiring, matching resistor in ECM
18057	P1649	CAN data bus, ABS - no signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18058	P1650	CAN data bus, instrumentation - no signal	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18060	P1652	Transmission control module (TCM) - system malfunction	Trouble code(s) stored
18061	P1653	ABS control module - system malfunction	Trouble code(s) stored
18062	P1654	Instrumentation control module - system malfunction	Trouble code stored for engine oil level/temperature sensor
-	P1655	Cruise control distance range control module - malfunction	Trouble code(s) stored
18064	P1656	AC signal - short to earth	Wiring short to earth
18065	P1657	AC signal - short to positive	Wiring
18066	P1658	CAN data bus, cruise control - incorrect signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM

18067	P1659	Engine coolant blower motor, speed 1 - short to positive	Wiring short to positive, engine coolant blower motor
18068	P1660	Engine coolant blower motor, speed 1 - short to earth	Wiring short to earth, engine coolant blower motor
18069	P1661	Engine coolant blower motor, speed 2 - short to positive	Wiring short to positive, engine coolant blower motor
18070	P1662	Engine coolant blower motor, speed 2 - short to earth	Wiring short to earth, engine coolant blower motor
18071	P1663	Injector, activation - short to positive	Wiring short to positive, ECM
18072	P1664	Injector, activation - current circuit	Wiring open circuit/short to earth
18073	P1665	Injector - mechanical fault	Injector
18074	P1666	Injector 1 - current circuit	Wiring open circuit/short to earth
18075	P1667	Injector 2 - current circuit	Wiring open circuit/short to earth
18076	P1668	Injector 3 - current circuit	Wiring open circuit/short to earth
18077	P1669	Injector 4 - current circuit	Wiring open circuit/short to earth
18080	P1672	Engine coolant blower motor, speed 1 - open circuit/short to earth	Wiring open circuit/short to earth
18081	P1673	CAN data bus, ABS - implausible VSS signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18082	P1674	CAN data bus, instrumentation - incorrect signal	Wiring, instrumentation control module trouble code(s) stored, matching resistor in ECM
18084	P1676	ETS warning lamp - circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18085	P1677	ETS warning lamp - short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18086	P1678	ETS warning lamp - short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18087	P1679	ETS warning lamp - open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18088	P1680	Limp-home mode - active	Throttle control unit, APP sensor
18089	P1681	Engine control module (ECM) - programming incomplete	ECM
18090	P1682	CAN data bus, ABS - implausible signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18091	P1683	CAN data bus, SRS - implausible signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
-	P1685	CAN data bus, steering position sensor - implausible signal	Wiring, steering position sensor, ABS fault
-	P1687	CAN data bus, AC control module - implausible signal	Wiring, AC system
18097	P1689	CAN data bus, multifunction control module - implausible signal	Multifunction control module trouble code(s) stored, wiring, matching resistor in ECM
18098	P1690	Malfunction indicator lamp (MIL) - circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18099	P1691	Malfunction indicator lamp (MIL) - open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18100	P1692	Malfunction indicator lamp (MIL) - short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18101	P1693	Malfunction indicator lamp (MIL) - short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18104	P1696	CAN data bus, steering column electronics - incorrect signal	Wiring, matching resistor in ECM
18106	P1698	Steering column electronics	Trouble code(s) stored, steering column control module
-	P1702	Transmission control module (TCM) - malfunction	TCM

-	P1841	Engine control module (ECM)/transmission control module (TCM) - not compatible	Wiring, ECM/TCM
-	P1847	ABS control module	Trouble code(s) stored
-	P1850	CAN data bus, ECM - missing information	Wiring, matching resistor in ECM
18259	P1851	CAN data bus, ABS - incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18261	P1853	CAN data bus, ABS - incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18262	P1854	CAN data bus, ABS - defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
-	P1855	CAN data bus, software version monitoring	Wiring, instrumentation control module, matching resistor in ECM
-	P1857	Engine control module (ECM) - load signal	Wiring, intake leak, MAF sensor
-	P1861	Engine control module (ECM), throttle control system - signal malfunction	Wiring, APP sensor, TP sensor
-	P1866	CAN data bus, missing information	Wiring, matching resistor in ECM
18308	P1900	Engine coolant blower motor, speed 2 - open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor
18309	P1901	Engine coolant blower motor run-on relay - short to positive	Wiring short to positive, engine coolant blower motor run-on relay
18310	P1902	Engine coolant blower motor run-on relay - open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor run-on relay
18311	P1903	Engine coolant hydraulic blower motor solenoid - short to positive	Wiring short to positive, engine coolant hydraulic blower motor solenoid
18312	P1904	Engine coolant hydraulic blower motor solenoid - open circuit/short to earth	Wiring open circuit/short to earth, engine coolant hydraulic blower motor solenoid
18313	P1905	Charge air coolant pump relay - short to positive	Wiring short to positive, charge air coolant pump relay
18314	P1906	Charge air coolant pump relay - open circuit/short to earth	Wiring open circuit/short to earth, charge air coolant pump relay
18315	P1907	Data bus, ECM 1/2 - defective	Wiring
18316	P1908	Data bus, ECM 1/2 - software version monitoring	Data in ECM 1 & ECM 2 does not match
18317	P1909	Data bus, ECM 1/2 - no signal from ECM 1	Wiring, ECM 1
18318	P1910	Data bus, ECM 1/2 - no signal from ECM 2	Wiring, ECM 2
18318	P1911	Data bus, ECM 1/2 - circuit malfunction	Wiring, ECM 1/2
18320	P1912	Brake servo pressure sensor - open circuit/short to positive	Wiring open circuit/short to positive, brake servo pressure sensor
18321	P1913	Brake servo pressure sensor - short to earth	Wiring short to earth, brake servo pressure sensor
18322	P1914	Brake servo pressure sensor - range/performance problem	Vacuum leak, wiring, brake servo pressure sensor
18328	P1920	Engine mounting control solenoid, bank 1 & 2 - open circuit/short to earth	Wiring open circuit/short to earth, engine mounting control solenoid
18331	P1923	Engine control module (ECM) 2 - malfunction	Trouble code(s) stored
-	P1924	Engine control module (ECM), coding - implausible signal	ECM
-	P1953	Turbocharger (TC) control module 2 - malfunction	Turbocharger
-	P1954	Glow plug control module 2 - circuit malfunction	Wiring, glow plug control module
-	P1955	Glow plug control module 2, ECM communication - range/performance problem	Wiring, glow plug control module, ECM
19456	P3000	CAN data bus, instrumentation - glow plug warning lamp	Wiring, matching resistor in ECM

19458	P3002	Accelerator pedal position (APP) sensor - transmission kick-down switch	APP sensor
19459	P3003	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
19461	P3005	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
19463	P3007	Camshaft position (CMP) sensor - no signal	Air gap, insecure sensor/rotor, wiring, CMP sensor
19464	P3008	Camshaft position (CMP) sensor - signal limit exceeded	Insecure rotor, camshaft alignment
19465	P3009	Fuel cooling pump relay - short to positive	Wiring short to positive, fuel cooling pump relay
19466	P3010	Fuel cooling pump relay - open circuit/short to earth	Wiring open circuit/short to earth, fuel cooling pump relay
19467	P3011	Fuel pump relay - short to positive	Wiring short to positive, fuel pump relay
19468	P3012	Fuel pump relay - open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
19469	P3013	Turbocharger (TC) wastegate regulating valve B - short to positive	Wiring short to positive, TC wastegate regulating valve
19470	P3014	Turbocharger (TC) wastegate regulating valve B - open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
19471	P3015	Fuel bypass valve - short to positive	Wiring short to positive, fuel bypass valve
19472	P3016	Fuel bypass valve - open circuit/short to earth	Wiring open circuit/short to earth, fuel bypass valve
-	P3028	Throttle motor position sensor 2, throttle control unit 2 - implausible signal	Wiring, throttle motor position sensor, throttle control unit
-	P3031	Throttle motor 2 - circuit malfunction	Wiring, throttle motor, throttle control unit
-	P3032	Throttle control unit 2 - basic setting	Basic setting not carried out
-	P3035	Throttle control unit 2 - mechanical fault	Throttle valve tight/sticking, throttle motor, throttle control unit
19496	P3040	Gear ratio - implausible	Transmission fault
19497	P3041	CAN data bus, instrumentation - implausible ECT signal	Wiring, matching resistor in ECM
-	P3045	Fuel pump (FP) - circuit malfunction	Wiring, fuel pump (FP), fuel pump (FP) control module
-	P3058	Exhaust gas recirculation (EGR) system - insufficient flow detected	Hose leak/blockage, wiring, EGR valve/solenoid
-	P3059	Exhaust gas recirculation (EGR) system - excessive flow detected	Wiring, EGR valve/solenoid
-	P3062	Turbocharger (TC) - turbo boost limit exceeded	Hoses interchanged/not connected, hoses blocked/leaking, intake leak, MAP sensor, TC wastegate control motor, TC
-	P3063	Turbocharger (TC) - boost pressure fault	Hoses interchanged/not connected, hoses blocked/leaking, intake leak, MAP sensor, TC wastegate control motor, TC
19534	P3078	Throttle control system - insufficient air flow at idle speed	Throttle valve housing requires cleaning, intake leak, wiring, MAF sensor, TP sensor, throttle control unit, ECM
-	P3081	Engine coolant temperature too low	Run engine until normal operating temperature, cooling system fault
-	P3092	Engine control module (ECM) - internal fault	ECM
-	P3093	Engine control module (ECM) - internal fault	ECM
-	P3096	Engine control module (ECM) - internal fault	ECM
-	P3097	Engine control module (ECM) - internal fault	ECM
-	P310A	Fuel system, low pressure - out of range	Wiring, fuel low pressure sensor, fuel pressure regulator control solenoid, fuel pump (FP), ECM
-	P310B	Fuel system, low pressure - intermittent/erratic pulses	Wiring, fuel low pressure sensor, fuel pressure regulator control solenoid, fuel pump (FP), ECM
-	P310C	Fuel system, low pressure - malfunction	Wiring, fuel low pressure sensor, fuel pressure regulator control solenoid, fuel pump (FP), ECM

19556	P3100	Intake manifold air control actuator - short circuit to positive	Wiring short to positive, intake manifold air control actuator
19557	P3101	Intake manifold air control actuator - short circuit to earth	Wiring short to earth, intake manifold air control actuator
19558	P3102	Intake manifold air control actuator - no signal	Wiring open circuit, intake manifold air control actuator
19559	P3103	Intake manifold air control actuator	Intake manifold air control actuator
19560	P3104	Intake manifold air control solenoid - short to positive	Wiring short to positive, intake manifold air control solenoid
19561	P3105	Intake manifold air control solenoid - open circuit/short to earth	Wiring open circuit/short to earth, intake manifold air control solenoid
-	P3137	Intake manifold air control system - basic setting	Basic setting not carried out, wiring, intake manifold air control actuator, intake manifold air control actuator position sensor
-	P3138	Intake manifold air control system - system deviation	Wiring, intake manifold air control actuator, intake manifold air control actuator position sensor
-	P3191	Intake manifold air control system, bank 1 - basic setting/actuator stuck closed	Basic setting not carried out, mechanical fault, wiring, intake manifold air control actuator, intake manifold air control actuator position sensor
-	P3192	Intake manifold air control system, bank 1 - basic setting/actuator stuck open	Basic setting not carried out, mechanical fault, wiring, intake manifold air control actuator, intake manifold air control actuator position sensor
-	P3193	Intake manifold air control system, bank 1 - circuit malfunction	Wiring, intake manifold air control actuator, intake manifold air control actuator position sensor
-	P3211	Heated oxygen sensor (HO2S) 1, bank 1 - heater circuit malfunction	Wiring, HO2S, ECM
-	P3255	Heated oxygen sensor (HO2S) 1, bank 1, heater circuit - upper limit reached	Wiring, HO2S, ECM
-	P3256	Heated oxygen sensor (HO2S) 1, bank 1, heater circuit - lower limit reached	Wiring, HO2S, ECM
19717	P3262	Heated oxygen sensor (HO2S) 2, bank 1 & 2 - interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
-	P3266	Heated oxygen sensor (HO2S) 1, bank 1 - internal resistance too high	Wiring, HO2S, ECM
-	P3328	Intake air flap control actuator 2 - short to positive	Wiring short to positive, intake air flap control actuator
-	P3329	Intake air flap control actuator 2 - open circuit/short to earth	Wiring open/short to earth, intake air flap control actuator
-	P3330	Intake air flap control actuator 2 - no signal	Wiring, intake air flap control actuator
-	P3331	Intake air flap control actuator 2 - malfunction	Wiring, air control flap tight/sticking, intake air flap control actuator
-	P3339	Glow plug timer relay 2 - circuit malfunction	Wiring, relay
65280	-	CAN data bus, ABS - defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
65535	-	Engine control module (ECM) - defective	ECM

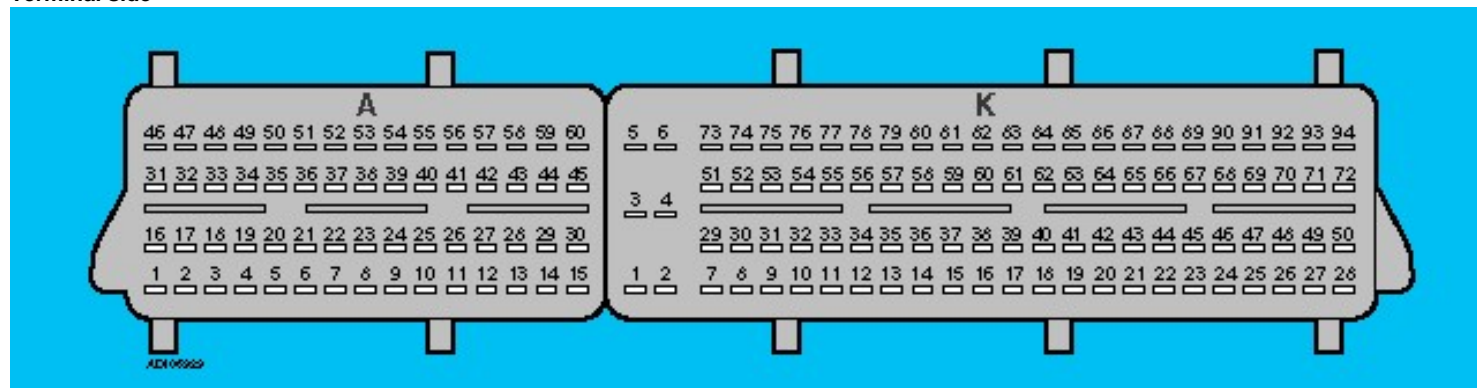




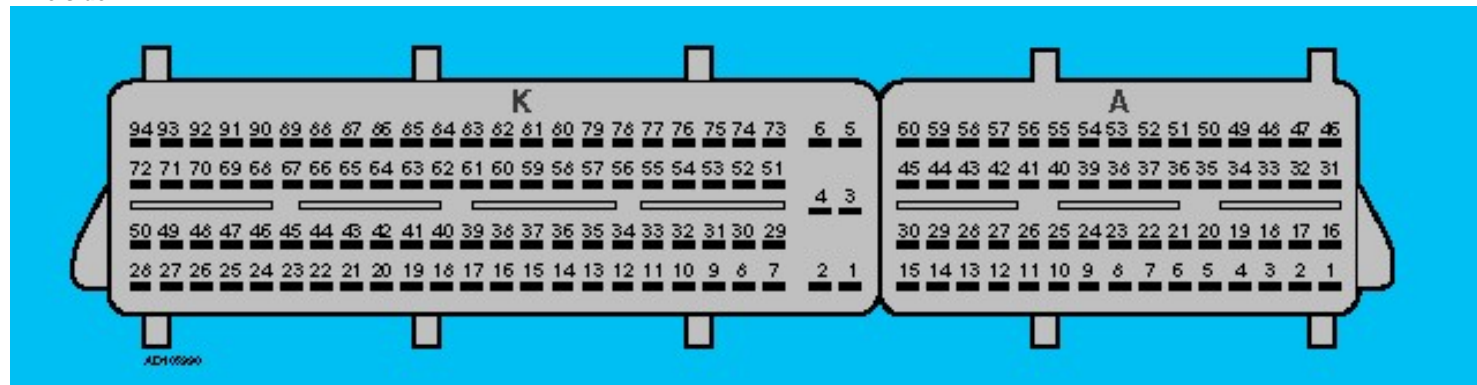
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




Terminal side




















































Wire side



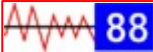

Component/circuit description	ECM pin	Signal	Condition	Typical value	Oscilloscope setting (Suggested settings - Voltage/time per division)	Wave form
Accelerator pedal position (APP) sensor	K11		Ignition ON	0 V		
Accelerator pedal position (APP) sensor	K12		Ignition ON - accelerator pedal released	0,3 V		
Accelerator pedal position (APP) sensor	K12		Ignition ON - accelerator pedal fully depressed	2 V		
Accelerator pedal position (APP) sensor	K13		Ignition ON	5 V		
Accelerator pedal position (APP) sensor	K33		Ignition ON	0 V		
Accelerator pedal position (APP) sensor	K34		Ignition ON - accelerator pedal released	0,7 V		
Accelerator pedal position (APP) sensor	K34		Ignition ON - accelerator pedal fully depressed	4 V		
Accelerator pedal position (APP) sensor	K35		Ignition ON	5 V		

Alternator	K64	⇒	Ignition ON	9,8 V	5 V/10 ms	 68
Alternator	K64	⇒	Engine idling		5 V/10 ms	 39
Battery	K92	←	Ignition OFF	11-14 V		
Brake pedal position (BPP) switch	K24	←	Ignition ON - brake pedal released	11-14 V		
Brake pedal position (BPP) switch	K24	←	Ignition ON - brake pedal depressed	0 V		
Brake pedal position (BPP) switch	K46	←	Ignition OFF - brake pedal released	0 V		
Brake pedal position (BPP) switch	K46	←	Ignition OFF - brake pedal depressed	11-14 V		
Brake system vacuum sensor	K31	↯	Ignition ON	0 V		
Brake system vacuum sensor	K37	⇒	Ignition ON	5 V		
Brake system vacuum sensor	K83	←	Ignition ON - brake servo evacuated	4 V		
Brake system vacuum sensor	K83	←	Engine idling	0,8 V		
Clutch position potentiometer	K18	←	Ignition ON - clutch pedal released	11,7 V		
Clutch position potentiometer	K18	←	Ignition ON - clutch pedal depressed	0 V		
Camshaft position (CMP) sensor	A10	⇒	Ignition ON	5 V		
Camshaft position (CMP) sensor	A23	←	Engine idling		2 V/50 ms	 14
Camshaft position (CMP) sensor	A42	↯	Ignition ON	0 V		
Camshaft position (CMP) actuator - 1,6	A5	↷	Ignition ON	11-14 V		
Camshaft position (CMP) actuator	A5	↷	Engine idling		5 V/0,5 ms	 4
CAN data bus - high	K68	↔		Connected pin - no test data available or random digital signal		
CAN data bus - low	K67	↔		Connected pin - no test data available or random digital signal		
Crankshaft position (CKP) sensor	A36	↯	Ignition ON	0 V		
Crankshaft position (CKP) sensor	A41	⇒	Ignition ON	5 V		
Crankshaft position (CKP) sensor	A51	←	Engine idling		2 V/2 ms	 73
Data link connector (DLC)	K86	↔	Ignition ON	10 V		
Data link connector (DLC)	K86	↔	Engine idling	12,2 V		
Earth	K1		Ignition ON	0 V		
Earth	K2		Ignition ON	0 V		
Earth	K4		Ignition ON	0 V		
Engine coolant blower motor control module	K71	⇒	Ignition ON	89%	5 V/10 ms	 99
Engine coolant blower motor control module	K71	⇒	Engine idling	81%	5 V/20 ms	 45
Engine coolant temperature (ECT) sensor 1	A27	←	Ignition ON - coolant temp. 10°C	2,7 V		
Engine coolant temperature (ECT) sensor 1	A42	↯	Ignition ON	0 V		

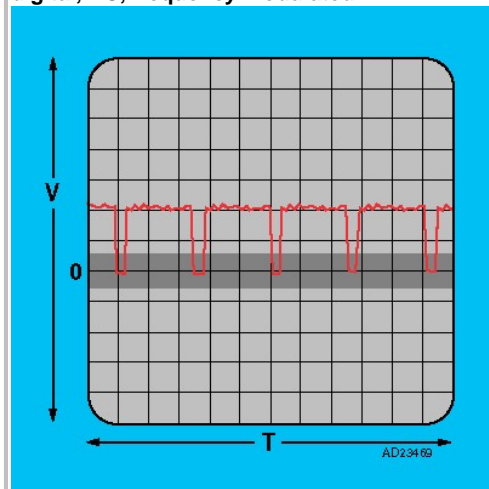
Engine coolant temperature (ECT) sensor 2	K57	←	Ignition ON - coolant temp. 10°C	2,7 V		
Engine coolant temperature (ECT) sensor 2	K57	←	Engine idling - engine hot	0,85 V		
Engine coolant temperature (ECT) sensor 2	K31	↯	Ignition ON	0 V		
Evaporative emission (EVAP) canister purge valve	A35	↯→	Ignition ON	11-14 V		
Evaporative emission (EVAP) canister purge valve	A35	↯→	Engine running - engine hot - valve operating	1-99%	10 V/20 ms	 20
Exhaust gas recirculation (EGR) valve actuator	A1	⇒	Engine idling - valve operating		2 V/1 ms	 71
Exhaust gas recirculation (EGR) valve actuator	A2	⇒	Engine idling	11-14 V		
Exhaust gas recirculation (EGR) valve position sensor	A10	⇒	Ignition ON	5 V		
Exhaust gas recirculation (EGR) valve position sensor	A42	↯	Ignition ON	0 V		
Exhaust gas recirculation (EGR) valve position sensor	A59	←	Ignition ON	0,86 V		
Exhaust gas recirculation (EGR) valve position sensor	A59	←	Engine idling	0,93 V		
Exhaust gas temperature sensor	K31	↯	Ignition ON	0 V		
Exhaust gas temperature sensor	K79	←	Ignition ON - engine cold	0,87 V		
Exhaust gas temperature sensor	K79	←	Engine idling - engine hot	1,55 V		
Fuel lift pump control module	K48	⇒	Engine idling		5 V/50 ms	 39
Fuel pressure regulator control solenoid	A19	↯→	Ignition ON	11-14 V		
Fuel pressure regulator control solenoid	A19	↯→	Engine idling		10 V/50 ms	 20
Fuel rail pressure (FRP) sensor	A10	⇒	Ignition ON	5 V		
Fuel rail pressure (FRP) sensor	A42	↯	Ignition ON	0 V		
Fuel rail pressure (FRP) sensor	A43	←	Ignition ON	1,96 V		
Fuel rail pressure (FRP) sensor	A43	←	Engine idling	2 V		
Fuel rail pressure (FRP) sensor	A43	←	Engine running - 3000 rpm	3,2 V		
Fuel system pressure sensor - low pressure	A10	⇒	Ignition ON	5 V		
Fuel system pressure sensor	A42	↯	Ignition ON	0 V		
Fuel system pressure sensor	A55	←	Ignition ON	0,62 V		
Fuel system pressure sensor	A55	←	Engine idling	2,1 V		
Heated oxygen sensor (HO2S)	K55	←	Engine idling	2,9 V		
Heated oxygen sensor (HO2S)	K56	⇒	Engine idling	3 V		
Heated oxygen sensor (HO2S)	K77	←	Engine idling	2,19 V		
Heated oxygen sensor (HO2S)	K78	←	Engine idling	2,54 V		
Heated oxygen sensor (HO2S) - heater control	K7	↯→	Ignition ON	11-14 V		

Heated oxygen sensor (HO2S)	K7		Engine idling		2 V/0,2 sec.	 55
Heater function control module	K30			Connected pin - no test data available or random digital signal		
Ignition amplifier 1	A7		Ignition ON	0 V		
Ignition amplifier 1	A7		Engine idling		2 V/20 ms	 106
Ignition amplifier 2	A21		Ignition ON	0 V		
Ignition amplifier 2	A21		Engine idling		2 V/20 ms	 106
Ignition amplifier 3	A22		Ignition ON	0 V		
Ignition amplifier 3	A22		Engine idling		2 V/20 ms	 106
Ignition amplifier 4	A6		Ignition ON	0 V		
Ignition amplifier 4	A6		Engine idling		2 V/20 ms	 106
Ignition main circuits relay 1	K3		Ignition OFF	0 V		
Ignition main circuits relay 1	K3		Ignition ON	11-14 V		
Ignition main circuits relay 1	K5		Ignition OFF	0 V		
Ignition main circuits relay 1	K5		Ignition ON	11-14 V		
Ignition main circuits relay 1	K6		Ignition OFF	0 V		
Ignition main circuits relay 1	K6		Ignition ON	11-14 V		
Ignition main circuits relay 1	K69		Ignition OFF	11-14 V		
Ignition main circuits relay 1	K69		Ignition ON	0-1 V		
Ignition main circuits relay 2	K87		Ignition OFF	0 V		
Ignition main circuits relay 2	K87		Ignition ON	11-14 V		
Injector 1	A32		Ignition ON	0 V		
Injector 1	A32		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 1	A33		Ignition ON	0 V		
Injector 1	A33		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 2	A31		Ignition ON	0 V		
Injector 2	A31		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 2	A48		Ignition ON	0 V		
Injector 2	A48		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 3	A46		Ignition ON	0 V		
Injector 3	A46		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 3	A49		Ignition ON	0 V		
Injector 3	A49		Engine idling - hot	1,8 ms	20 V/1 ms	 111
Injector 4	A34		Ignition ON	0 V		
Injector 4	A34		Engine idling - hot	1,8 ms	20 V/1 ms	 111

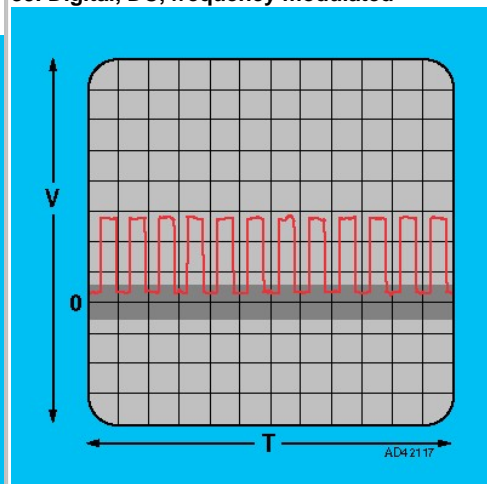
Injector 4	A47	⇒	Ignition ON	0 V		
Injector 4	A47	⇒	Engine idling - hot	1,8 ms	20 V/1 ms	
Intake air temperature (IAT) sensor 1	A42	⚡	Ignition ON	0 V		
Intake air temperature (IAT) sensor 1	A44	←	Ignition ON - air temp. 10°C	2,7 V		
Intake air temperature (IAT) sensor 2	A28	←	Ignition ON - air temp. 10°C	2,7 V		
Intake air temperature (IAT) sensor 2	A42	⚡	Ignition ON	0 V		
Intake manifold air control actuator position sensor	A10	⇒	Ignition ON	5 V		
Intake manifold air control actuator position sensor	A42	⚡	Ignition ON	0 V		
Intake manifold air control actuator position sensor	A57	←	Ignition ON	1,44 V		
Intake manifold air control actuator position sensor	A57	←	Engine idling	3,2 V		
Intake manifold air control solenoid	A45	⚡⇒	Ignition ON	11-14 V		
Intake manifold air control solenoid	A45	⚡⇒	Engine idling	0-1 V		
Intake manifold air control solenoid	A45	⚡⇒	Engine running - full throttle briefly	11-14 V briefly		
Knock sensor (KS)	A8	⚡	Ignition ON	0 V		
Knock sensor (KS)	A39	←	Ignition ON	2,2 V		
Knock sensor (KS)	A39	←	Engine idling - accelerate briefly		50 mV/1 ms	
Knock sensor (KS)	A54	←	Ignition ON	2,2 V		
Knock sensor (KS)	A54	←	Engine idling - accelerate briefly		50 mV/1 ms	
Manifold absolute pressure (MAP) sensor	A10	⇒	Ignition ON	5 V		
Manifold absolute pressure (MAP) sensor	A42	⚡	Ignition ON	0 V		
Manifold absolute pressure (MAP) sensor	A58	←	Ignition ON	4 V		
Manifold absolute pressure (MAP) sensor	A58	←	Engine idling	1,2 V		
Manifold absolute pressure (MAP) sensor	A58	←	Engine running - full throttle briefly	3,8 V briefly		
Nitrogen oxide (NOx) sensor control module	K29	⚡⇒	Ignition ON	11-14 V		
Nitrogen oxide (NOx) sensor control module	K29	⚡⇒	Engine idling		5 V/20 ms	
Nitrogen oxide (NOx) sensor control module	K53	←	Ignition ON	4,78 V		
Nitrogen oxide (NOx) sensor control module	K53	←	Engine idling	4,81 V		
Nitrogen oxide (NOx) sensor control module	K54	←	Ignition ON	2,4 V		
Nitrogen oxide (NOx) sensor control module	K54	←	Engine idling	2,52 V		
Nitrogen oxide (NOx) sensor control module	K76	←	Ignition ON	0,65 V		
Nitrogen oxide (NOx) sensor control module	K76	←	Engine idling	0,8 V		

Nitrogen oxide (NOx) sensor control module	K80	←	Ignition ON	2,48 V		
Nitrogen oxide (NOx) sensor control module	K80	←	Engine idling	3,54 V		
Nitrogen oxide (NOx) sensor control module	K81	←	Ignition ON	4,75 V		
Nitrogen oxide (NOx) sensor control module	K81	←	Engine idling	2,19 V		
Steering column function control module	K25			Connected pin - no test data available or random digital signal		
Throttle motor	A16	⇒	Ignition ON	3,19 V (after 3 seconds)		
Throttle motor	A16	⇒	Engine idling		2 V/10 ms	Intermittent  88
Throttle motor	A17	⇒	Ignition ON	3,19 V (after 3 seconds)		
Throttle motor	A17	⇒	Engine idling		2 V/1 ms	 71
Throttle motor position sensor	A11	←	Ignition ON - accelerator pedal released	4,16 V briefly		
Throttle motor position sensor	A11	←	Ignition ON - accelerator pedal fully depressed	0,67 V briefly		
Throttle motor position sensor	A11	←	Engine idling	4,38 V		
Throttle motor position sensor	A12	↔	Ignition ON	0 V		
Throttle motor position sensor	A25	⇒	Ignition ON	5 V		
Throttle motor position sensor	A26	←	Ignition ON - accelerator pedal released	0,8 V		
Throttle motor position sensor	A26	←	Ignition ON - accelerator pedal fully depressed	4,3 V briefly		
Throttle motor position sensor	A26	←	Engine idling	0,76 V		

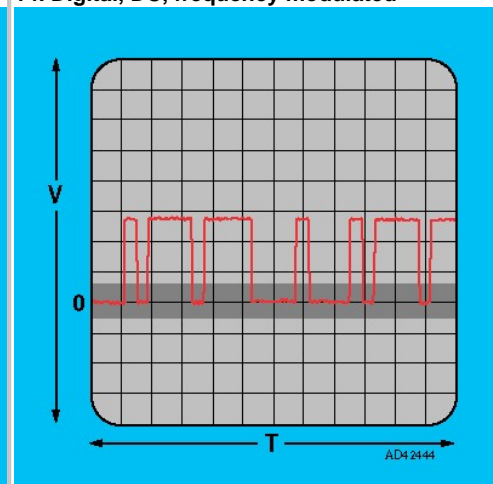
68. Digital, DC, pulse width modulated or digital, DC, frequency modulated



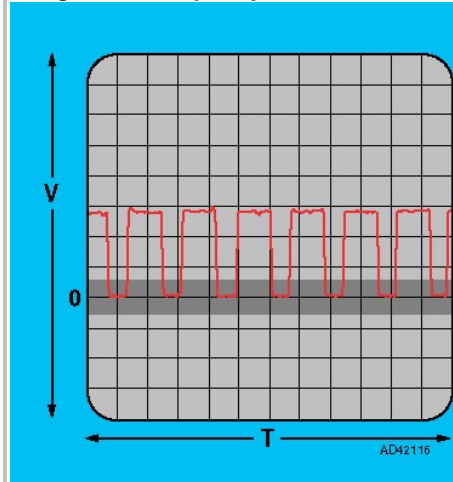
39. Digital, DC, frequency modulated



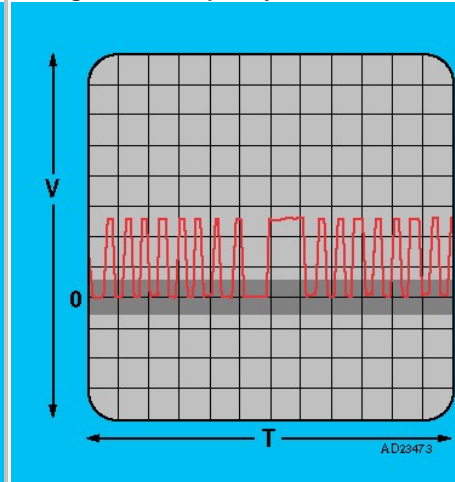
14. Digital, DC, frequency modulated



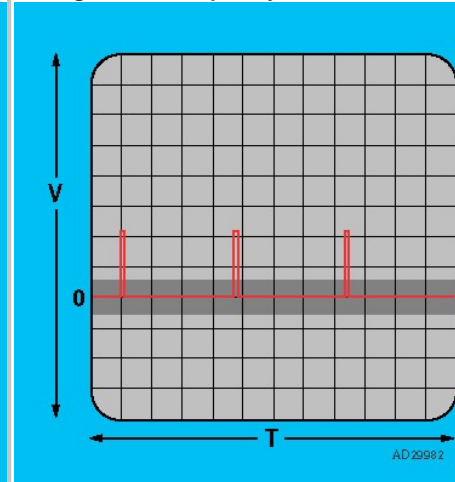
4. Digital, DC, frequency modulated



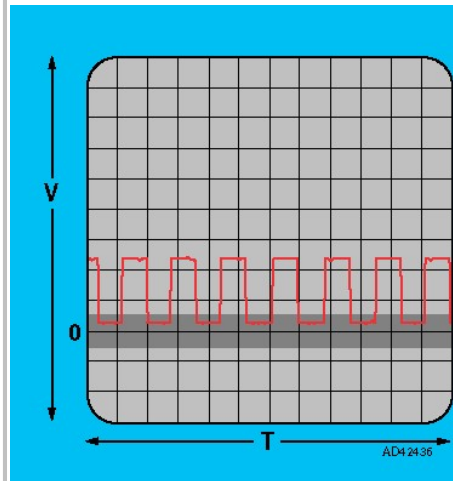
73. Digital, DC, frequency modulated



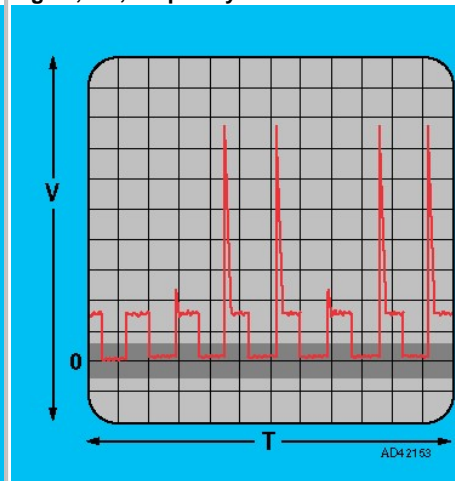
99. Digital, DC, frequency modulated



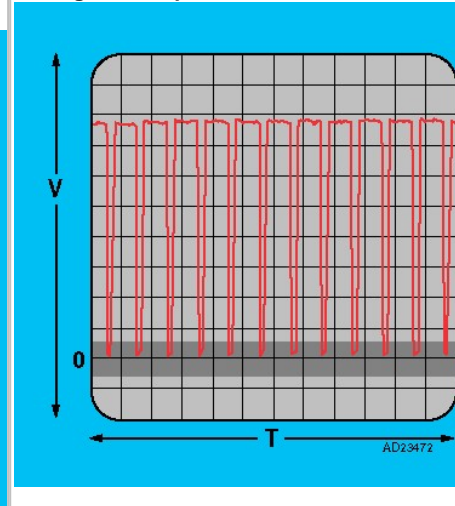
45. Digital, DC, frequency & pulse width modulated



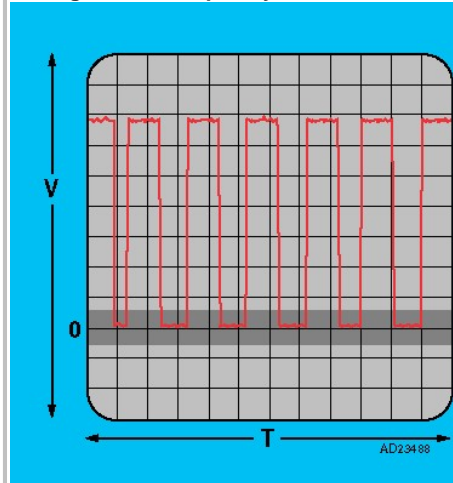
20. Digital, DC, pulse width modulated or digital, DC, frequency modulated



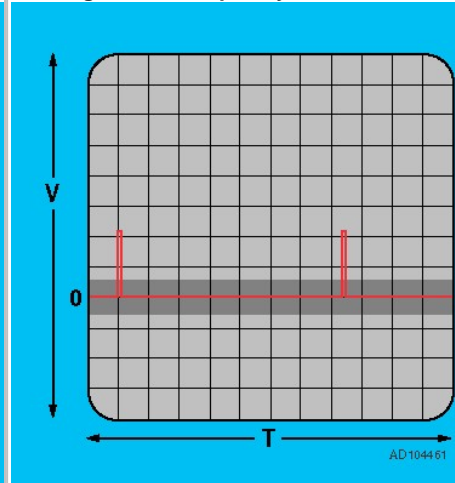
71. Digital, DC, pulse width modulated



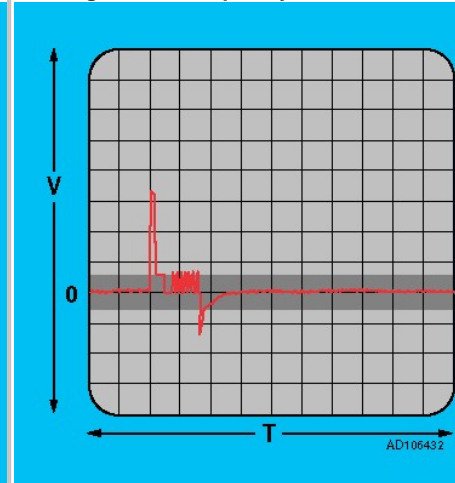
55. Digital, DC, frequency modulated



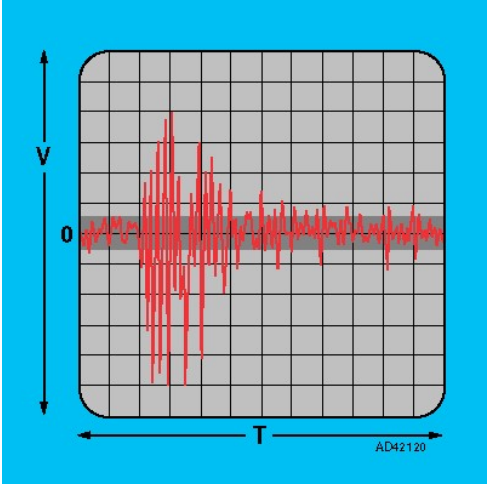
106. Digital, DC, frequency modulated



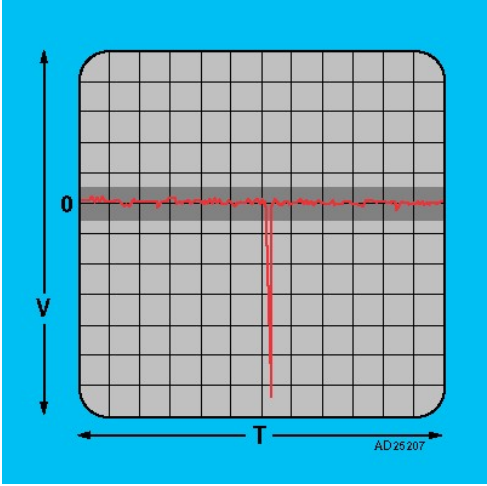
111. Digital, DC, frequency modulated








38. Analogue, AC



88. Digital, DC, frequency modulated



	input/output signal
	input signal
	output signal
	ECM switched earth
	ECM earth circuit



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Fuel system

Fuel pressure

Checking - [Fig. 1](#) & [Fig. 2](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Pressure	Condition	Value
System	Vacuum OFF	3,0 bar approx.
Regulated	Vacuum 0,5 bar	2,5 bar approx.

NOTE: For accurate model specific fuel pressure information, refer to Technical Data module.

- Ensure ignition switched OFF.
- Connect pressure gauge between fuel supply pipe and fuel rail [Fig. 1](#).
- Start engine.
- Allow to idle.
- If fitted: Disconnect vacuum hose from fuel pressure regulator.
- Compare system pressure indicated with that specified.

NOTE: On some later models the fuel pressure regulator is located in the fuel tank and has no vacuum connection.

- If fitted: Connect vacuum pump to fuel pressure regulator.
- Apply vacuum.
- Compare regulated pressure indicated with that specified.
- If engine does not start:
- Disconnect fuel pump multi-plug.
- Connect lead between the fuel pump earth terminal and earth [Fig. 2](#).
- Connect a switched lead between the fuel pump supply terminal and battery positive [Fig. 2](#).
- Operate switch to run fuel pump.
- Compare system pressure indicated with that specified.
- Apply vacuum.
- Compare regulated pressure indicated with that specified.

Fuel delivery rate

Checking - [Fig. 2](#) & [Fig. 3](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Voltage	Delivery rate
10 V	0,5 litre min./20 secs.
11 V	0,6 litre min./20 secs.
12 V	0,8 litre min./20 secs.

NOTE: On some later models it is not practical to carry out this check as there is no return pipe on the fuel rail. The fuel pressure regulator is located in the fuel tank.

- Ensure ignition switched OFF.
- Disconnect fuel return pipe.
- Connect test pipe to connection on fuel return pipe.
- Insert end of pipe into measuring flask [Fig. 3](#).
- Disconnect fuel pump multi-plug.
- Connect lead between the fuel pump earth terminal and earth [Fig. 2](#).
- Connect a switched lead between the fuel pump supply terminal and battery positive [Fig. 2](#).
- Operate switch to run fuel pump.
- Check supply voltage during pump operation.
- Compare delivery rate indicated with that specified.

Injectors

Checking resistance - [Fig. 4](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Condition	Resistance
Without injector series resistor	12-17 Ω
With injector series resistor	2-3 Ω

- Ensure ignition switched OFF.
- Disconnect injector multi-plugs.
- Check resistance between injector terminals.
- Repeat test for each injector.

Checking supply voltage - [Fig. 5](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Voltage	Battery voltage

NOTE: Probing injector terminals should reveal one terminal (supply) with a voltage at or near battery voltage and one terminal (signal) with a voltage switching from 0 V to battery voltage.

- Ensure ignition switched OFF.
- Disconnect injector multi-plug(s).
- Switch ignition ON or briefly crank engine.
- Check voltage between harness multi-plug terminal and earth.
- If voltage not as specified: Check wiring and fuses.

Checking signal - Fig. 5

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

NOTE: Probing injector terminals should reveal one terminal (supply) with a voltage at or near battery voltage and one terminal (signal) with a voltage switching from 0 V to battery voltage.

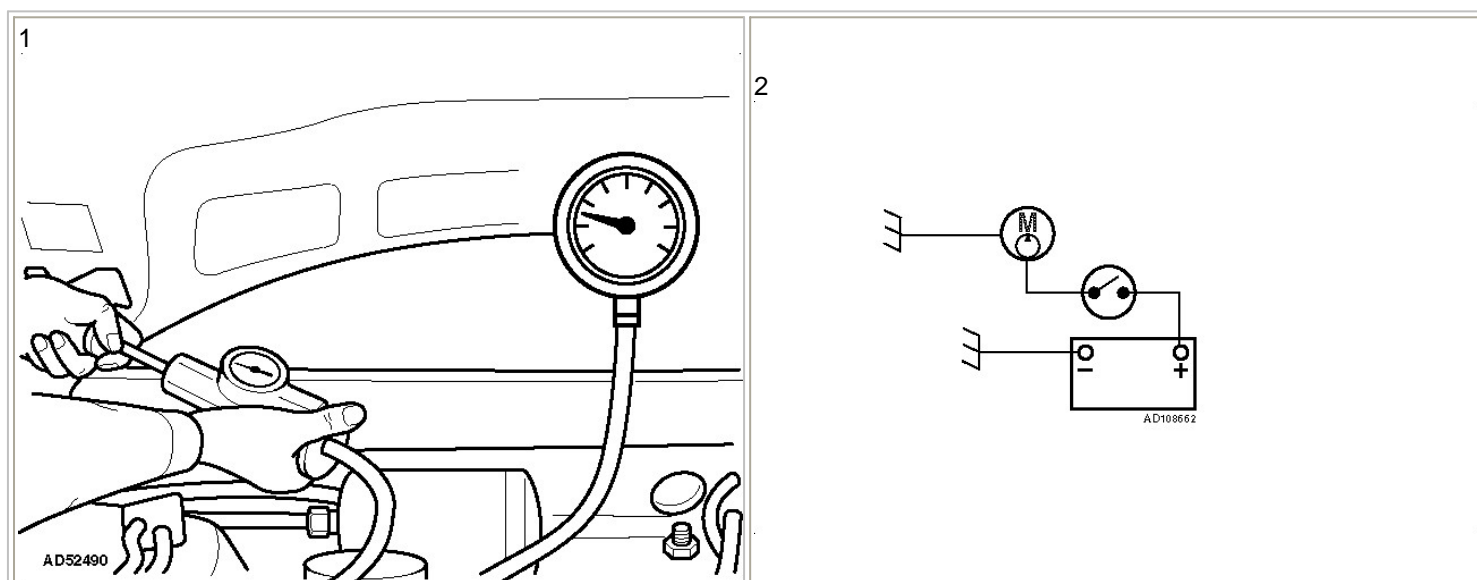
- Ensure ignition switched OFF.
- Disconnect injector multi-plug(s).
- Connect LED test lamp between harness multi-plug terminals.
- Briefly crank engine.
- Check that LED flashes.

Fuel pump

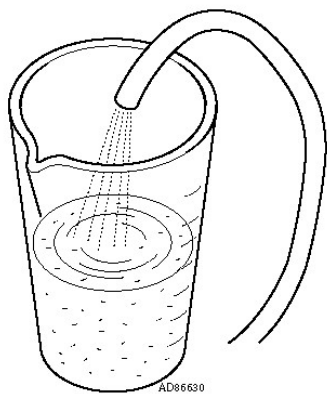
Checking operation - Fig. 2

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

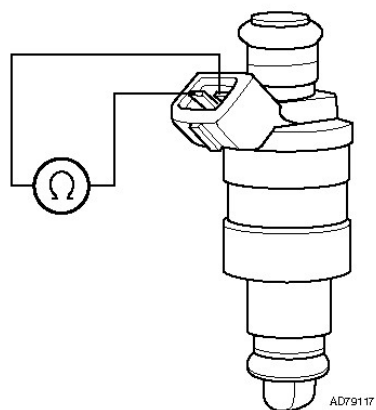
- Ensure ignition switched OFF.
- Connect a switched lead between the fuel pump supply terminal and battery positive.
- Fuel pump should run continuously when switch is operated.
- If pump does not run: Check wiring. Check fuses.



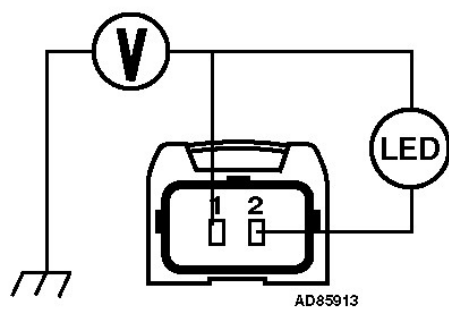
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4



5





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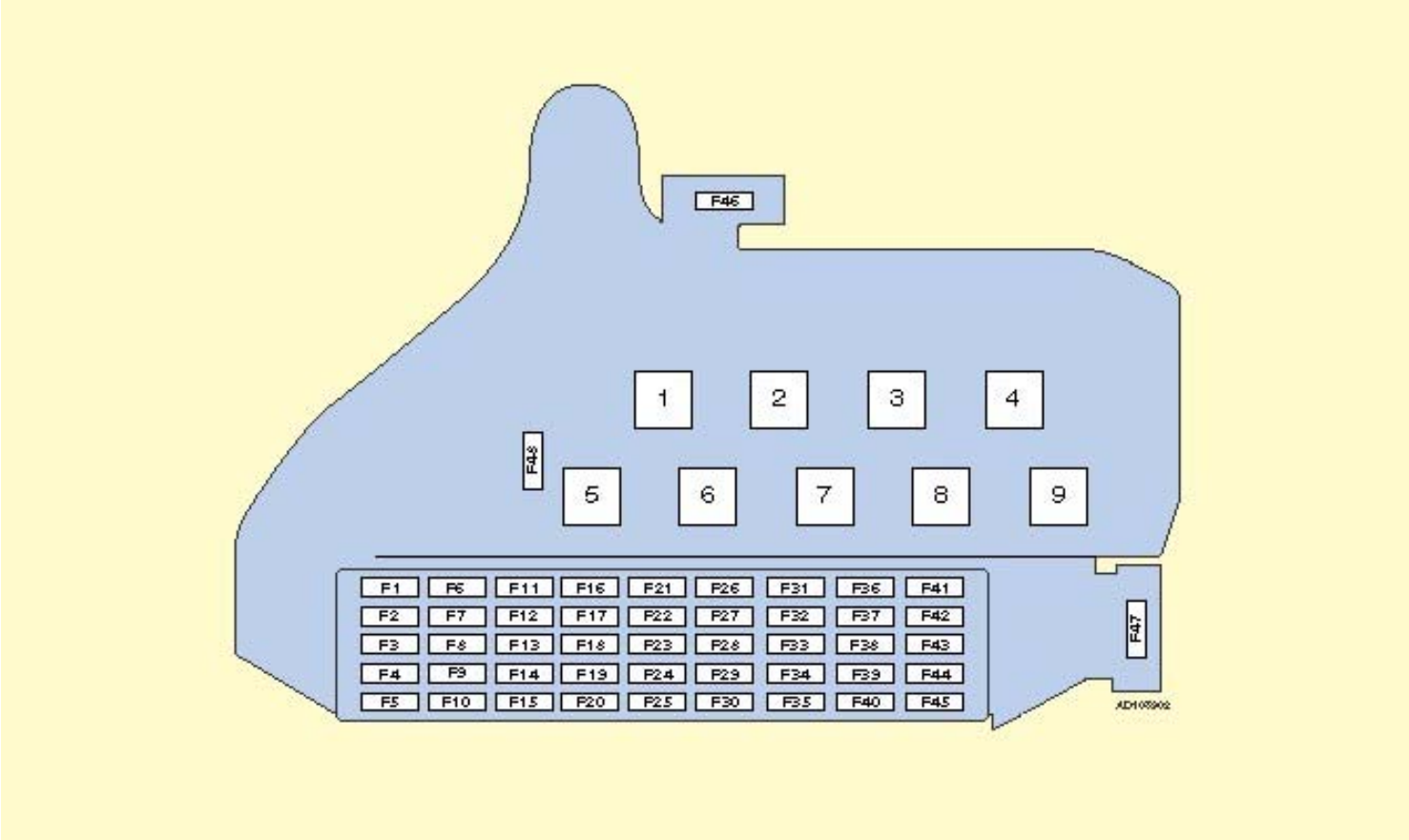
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F1 (10A)	Instrumentation control module
F2 (20A)	Audio system, navigation system
F3 (20A)	Instrumentation voltage stabiliser
F4 (20A)	Engine coolant blower motor
F5	-
F6 (25A)	Windscreen wipers
F7 (15A)	Hazard warning lamps
F8 (25A)	Horn, sunroof
F9	-
F10 (30A)	Trailer socket (2003->)
F11 (20A)	Auxiliary power socket - luggage compartment
F12 (15A)	Cigarette lighter
F13 (15A)	Heated front seats
F14 (30A)	Auxiliary heater, engine coolant heater (Diesel)
F15 (30A)	Air conditioning (AC), heated rear window
F16 (30A)	Heater/air conditioning (AC)
F17	-
F18 (20A)	Fuel pump (FP)
F19 (20A)	Engine management
F20 (20A)	Engine management
F21 (10A)	RH headlamp - high beam
F22 (10A)	LH headlamp - high beam
F23 (15A)	Headlamp adjustment, RH headlamp - low beam
F24 (15A)	Headlamp adjustment, LH headlamp - low beam

F25 (5A)	Telephone
F26 (5A)	RH side/tail lamps
F27 (5A)	LH side/tail lamps
F28 (10A)	Data link connector (DLC)
F29 (15A)	Data link connector (DLC), navigation system (->2002), parking aid control module (->2002), reversing lamps
F30 (10A)	Stop lamps
F31 (10A)	Auxiliary heater, cruise control, engine coolant heater (Diesel), engine management, heater/air conditioning (AC), stop lamps
F32 (10A)	Glove box lamp, licence plate lamps
F33 (5A)	Heated windscreen washer jets
F34 (10A)	Indicators/hazard warning lamps
F35 (15A)	Fog lamps
F36 (10A)	Alarm system, heater/air conditioning (AC), multifunction control module
F37 (10A)	Navigation system, parking aid control module
F38 (10A)	Air conditioning (AC), hazard warning lamps, heated front seats, heated rear window, parking aid control module, power steering control module, navigation system
F39 (10A)	Door function control module, right rear, door function control module, driver
F40 (10A)	Anti-lock brake system (ABS)
F41 (10A)	Door function control module, left rear, door function control module, passenger
F42 (10A)	Alarm system, multifunction control module
F43 (10A)	Transmission control module (TCM)
F44 (10A)	Transmission control module (TCM)
F45 (15A)	Engine management
F46 (1A)	Steering wheel multifunction switch
F47 (60A)	Auxiliary heater
F48 (40A)	Engine coolant blower motor control module
1	Cranking cut-off relay, auxiliary circuits
2	-
3	Stop lamps cut-off relay
4	Engine coolant heater relay 2 - high output
5	Horn relay
6	Bulb failure warning system relay
7	Bulb failure warning system relay

8	Engine coolant heater relay 1 - low output
9	Ignition auxiliary circuits relay

Fascia 1



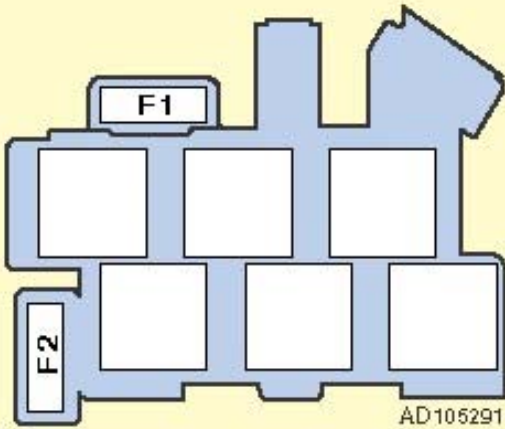


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F1 (30A)	Front electric windows
F2 (10A)	Electric seats

Fascia 2



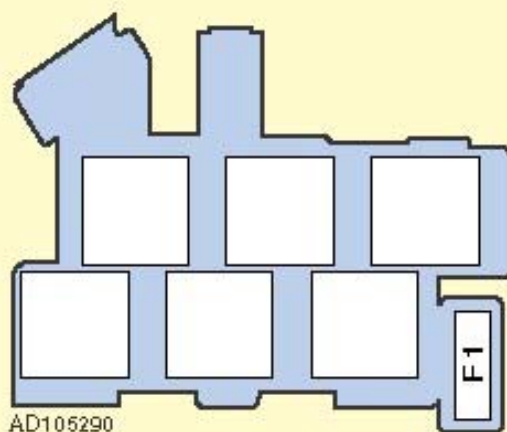
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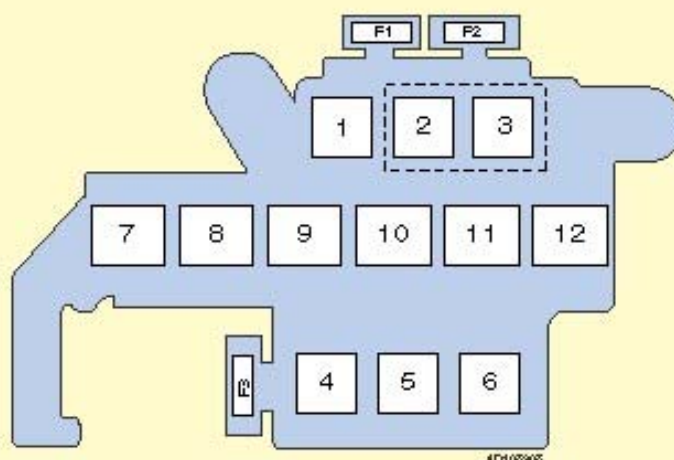


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F1 (30A)	Rear electric windows
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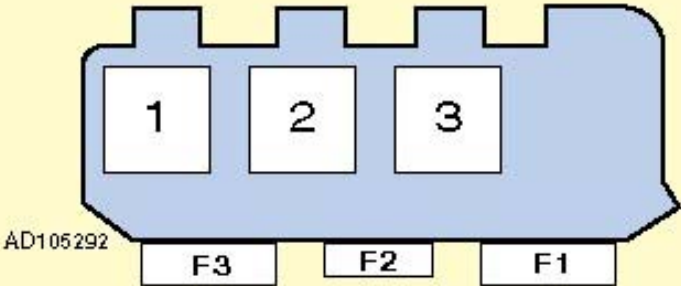


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F1 (30A)	Engine management - 1,6 FSI (BAD)
F1 (60A)	Engine management - 1,2 TDI PD (ANY)/1,4 TDI PD (AMF)/1,4 TDI PD (BHC)
F1 (40A)	Glow plugs - 1,4 TDI PD (ATL)
F2 (10A)	Engine management - Diesel
F2 (5A)	Engine management - 1,6 FSI (BAD)
F3 (80A)	Power steering
1	Engine control (EC) relay - 1,4 TDI PD (ATL)1,6 FSI (BAD)
1	Glow plug relay - 1,2 TDI PD (ANY)/1,4 TDI PD (AMF/BHC)
2	Engine control (EC) relay - 1,2 TDI PD (ANY)/,4 TDI PD (AMF/BHC)
2	Glow plug control module - 1,4 TDI PD (ATL)
3	-

Footwell 2





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General information

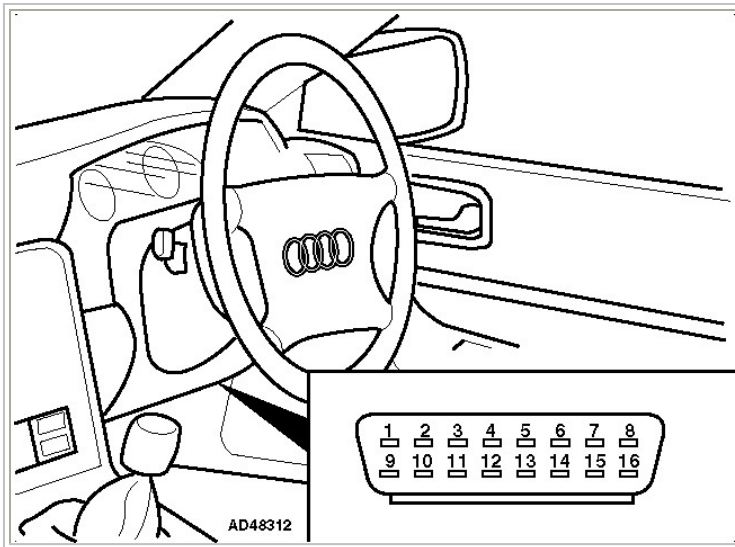
- System malfunction: Engine runs for approximately 1 second and then cuts out.
- Data link connector (DLC) - 2-pin: (A) black, (B) brown/white.

Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	-
00546	Immobilizer control module, data wire - implausible authorisation signal	Wiring, incorrectly coded, ignition switched OFF/ON too quickly, immobilizer control module
00750	Immobilizer warning lamp	Wiring, immobilizer warning lamp
01128	Immobilizer read coil	Wiring, immobilizer read coil, immobilizer control module
01176	Ignition key - incorrect signal	Ignition key not matched/damaged, poor connection, wiring, immobilizer read coil
01177	Engine control module (ECM)/fuel shut-off solenoid control module - not authorised	ECM/fuel shut-off solenoid control module not matched to immobilizer control module
01179	Ignition key programming - incorrectly matched	Malfunction during ignition key programming
01181	Ignition key programming - initial matching	Stored value for quantity of keys to be programmed exceeded, erase and re-check fault memory
01202	Data link connector (DLC)	Wiring short circuit, immobilizer control module
01237	Fuel shut-off solenoid	Fuel shut-off solenoid control module, fuel shut-off solenoid
01312	CAN data bus - defective	Immobilizer control module incorrectly coded, trouble code(s) stored in other system(s), wiring
01314	CAN data bus, ECM	ECM trouble code(s) stored, ECM incorrectly coded, wiring
01354	CAN data bus - authorisation signal	Wiring, immobilizer control module
65535	Immobilizer control module - defective	DLC wiring, immobilizer control module





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Intake system

Throttle position (TP) sensor

Checking - [Fig. 6](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminal	Condition	Voltage
Earth	Ignition ON	0 V approx.
Supply	Ignition ON	5 V approx.
Signal	Ignition ON - throttle closed	0,5-1 V approx.
Signal	Ignition ON - throttle fully open	4-4,8 V approx.

NOTE: Probing TP sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V and one terminal (signal) with a variable voltage dependent upon throttle position.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access TP sensor multi-plug terminals.
- Switch ignition ON.
- Check voltage between TP sensor terminals and earth.
- Operate throttle valve while checking signal voltage.
- Voltage change should be smooth.

Closed throttle position (CTP) switch

Checking - [Fig. 7](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Resistance
1 & 2	Throttle closed	Zero
1 & 2	Throttle slightly open	∞

NOTE: The closed throttle position (CTP) switch may be incorporated in the throttle position (TP) sensor, usually identified by having 4 or 5 terminals.

- Ensure ignition switched OFF.
- Disconnect CTP switch or TP sensor multi-plug.
- Check resistance between CTP switch terminals.
- Operate throttle valve while checking resistance between terminals.

Mass air flow (MAF) sensor

Checking - [Fig. 8](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminal	Condition	Voltage
Earth	Ignition ON	0 V approx.
Sensor supply	Ignition ON	5 V approx.
Supply	Ignition ON	11-14 V
Signal	Ignition ON	0-0,5 V approx.
Signal	Engine idling	0,5-1,5 V approx.
Signal	Engine running - full load	3,5-4,9 V approx.

NOTE: Probing MAF sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (sensor supply) with a voltage at or near 5 V and one terminal (signal) with a variable voltage dependent upon air flow. Some MAF sensors also have a battery voltage supply terminal with a voltage at or near 12 V and may also incorporate an intake air temperature (IAT) sensor terminal with a voltage of 2,5-4 V at 10-20 °C.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access MAF sensor multi-plug terminals.
- Switch ignition ON.
- Check voltage between multi-plug terminals and earth.
- Start engine.
- Allow to idle.
- Check signal voltage between multi-plug terminals and earth.
- Increase engine speed sharply.
- Check signal voltage between multi-plug terminals and earth.

NOTE: Signal voltage increases with increasing air flow through MAF sensor.

Volume air flow (VAF) sensor

Checking operation - [Fig. 9](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminal	Condition	Voltage
Earth	Ignition ON	0 V approx.
Supply	Ignition ON	5 V approx.
Signal	Ignition ON - flap closed	0,1-1 V
Signal	Ignition ON - flap open	4,5-5 V

NOTE: Probing VAF sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V and one terminal (signal) with a variable voltage dependent upon sensor flap position. Some VAF sensors also incorporate an intake air temperature (IAT) sensor terminal with a voltage of 2,5-4 V at 10-20 °C.

- Ensure ignition switched OFF.
- Disconnect intake air trunking from VAF sensor.
- Do not disconnect multi-plug. Access VAF sensor multi-plug terminals.
- Switch ignition ON.
- Check voltage between multi-plug terminals and earth.
- Operate sensor flap over full extent of travel.
- Check signal voltage between multi-plug terminal and earth.
- Voltage change should be smooth.

Manifold absolute pressure (MAP) sensor

Checking - analogue type - [Fig. 10](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Voltage
Earth	Ignition ON	0 V approx.
Supply	Ignition ON	5 V approx.
Signal	Ignition ON	4,5-5 V
Signal	Engine idling	0,8-1,7 V
Signal	Engine running - full load	4,5-5 V

NOTE: Probing MAP sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V and one terminal (signal) with a variable voltage dependent upon intake manifold pressure.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access MAP sensor multi-plug terminals.
- Switch ignition ON.
- Check voltage between multi-plug terminals and earth.
- Start engine.
- Allow to idle.
- Check signal voltage between multi-plug terminal and earth.
- Increase engine speed sharply.
- Check signal voltage between multi-plug terminal and earth.

Checking - Ford digital type - [Fig. 11](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical		
Terminals	Condition	Frequency
Earth	Ignition ON	0 V approx.
Supply	Ignition ON	5 V approx.
Signal	Ignition ON	160 Hz
Signal	Engine idling	105 Hz
Signal	Engine running - full load	160 Hz

NOTE: Probing MAP sensor terminals should reveal one terminal (earth) with a voltage at or near 0 V, one terminal (supply) with a voltage at or near 5 V and one terminal (signal) with a variable frequency dependent upon intake manifold pressure.

- Ensure ignition switched OFF.
- Do not disconnect multi-plug. Access MAP sensor multi-plug terminals.
- Switch ignition ON.
- Check voltage between multi-plug terminals and earth.
- Check signal frequency between multi-plug terminal and earth.
- Start engine.
- Allow to idle.
- Check signal frequency between multi-plug terminal and earth.

Intake air temperature (IAT) sensor

Checking resistance - [Fig. 12](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Temperature	Resistance
15-25°C	38000 Ω approx.
15-25°C	2000-3300 Ω approx.

- Ensure ignition switched OFF.
- Disconnect IAT sensor multi-plug.
- Check ambient air temperature.
- Check resistance between IAT sensor terminals.

Idle air control (IAC) valve

Checking resistance - 2-wire type - [Fig. 13](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	10-20 Ω approx.

- Ensure ignition switched OFF.
- Disconnect IAC valve multi-plug.
- Check resistance between IAC valve terminals.

Checking resistance - 3-wire type - [Fig. 14](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Terminals	Resistance
1 & 3	30 Ω approx.
1 & 2	15 Ω approx.
2 & 3	15 Ω approx.

- Ensure ignition switched OFF.
- Disconnect IAC valve multi-plug.
- Check resistance between IAC valve terminals.

Checking resistance - 4-wire type - [Fig. 15](#) & [Fig. 16](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Terminals	Resistance
A & B	40-60 Ω approx.
C & D	40-60 Ω approx.
A & D	40-60 Ω approx.
B & C	40-60 Ω approx.

- Ensure ignition switched OFF.
- Disconnect IAC valve multi-plug.
- Check resistance between IAC valve terminals.

Intake manifold air control solenoid

Checking resistance - [Fig. 17](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	25-85 Ω approx.

- Ensure ignition switched OFF.
- Disconnect intake manifold air control solenoid multi-plug.
- Check resistance between intake manifold air control solenoid terminals.

Turbocharger (TC) wastegate regulating valve

Checking resistance - [Fig. 18](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

Technical Data - typical	
Resistance	20-40 Ω approx.

- Ensure ignition switched OFF.
- Disconnect TC wastegate regulating valve multi-plug.
- Check resistance between TC wastegate regulating valve terminals.

Barometric pressure (BARO) sensor

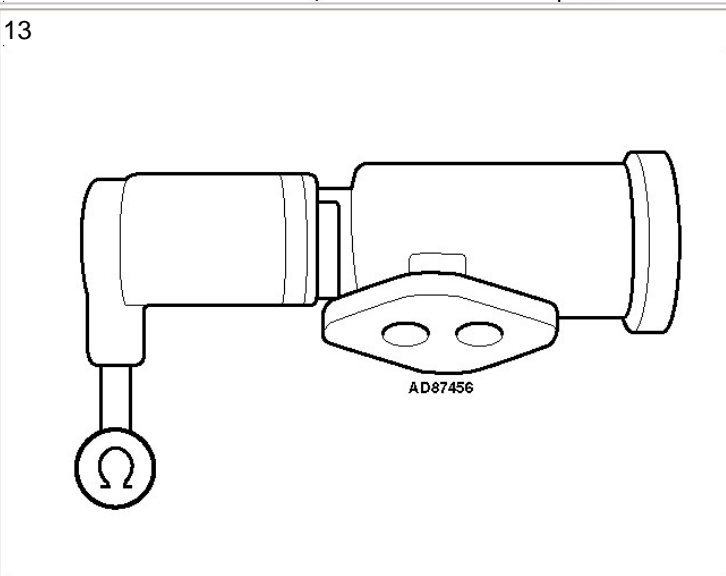
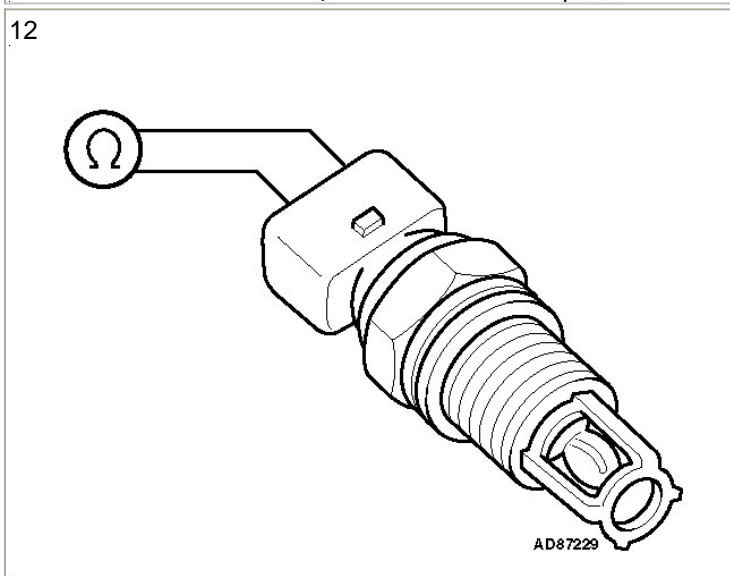
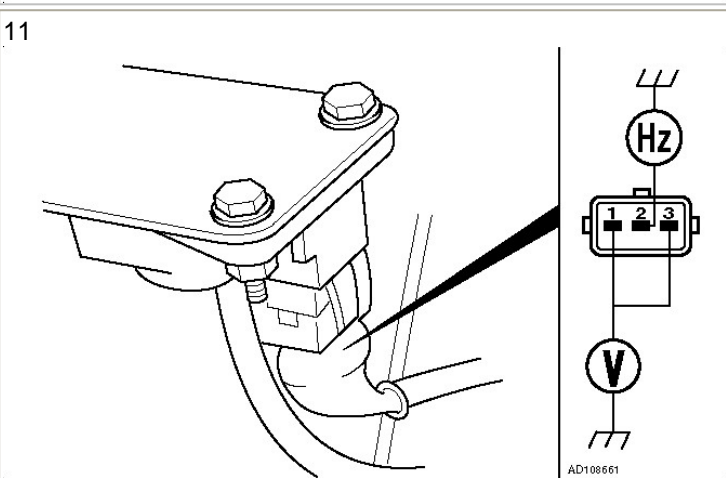
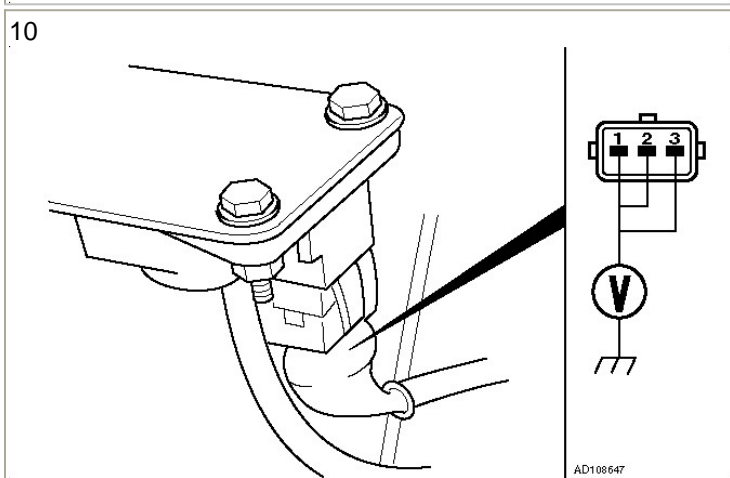
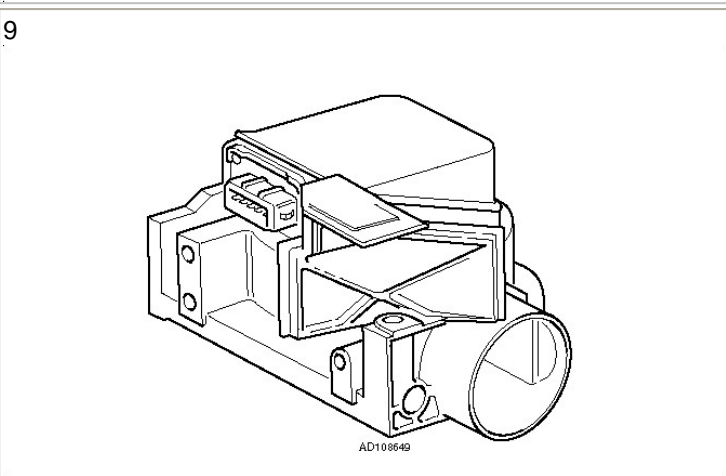
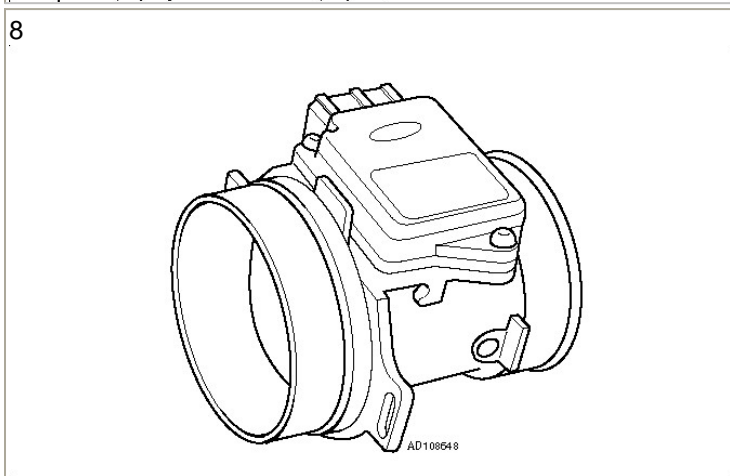
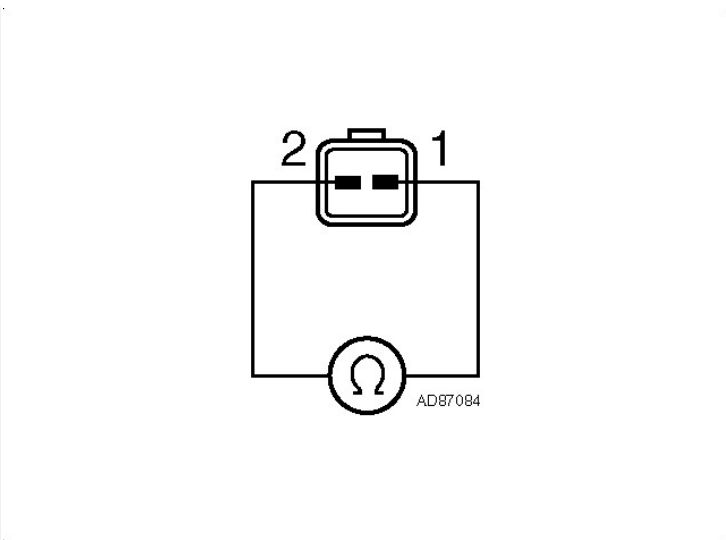
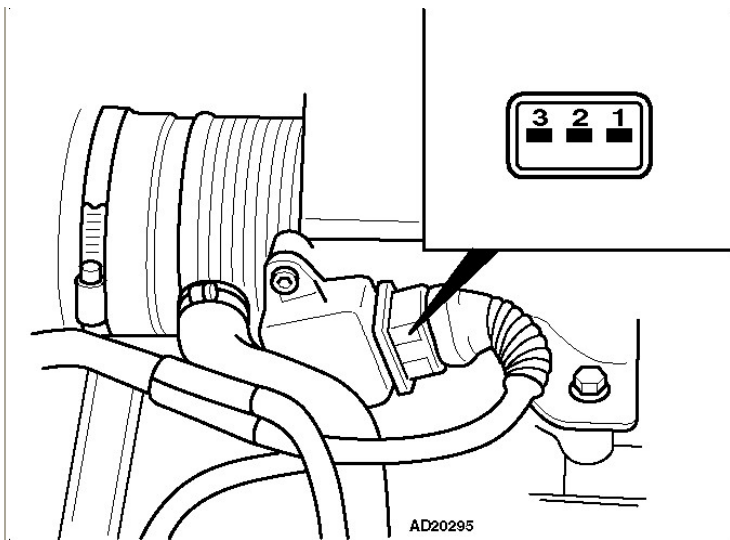
Checking - [Fig. 19](#)

WARNING: This information is NOT model specific. The information below is general and is provided to help your diagnosis.

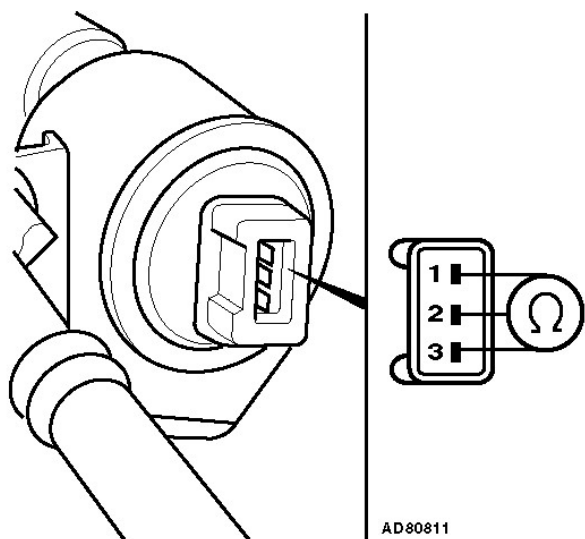
Technical Data - typical		
Terminals	Condition	Resistance
1 & 2	-	1200 Ω approx.
1 & 3	-	2650 Ω approx.
2 & 3	-	2370 Ω approx.
1 & 2	See text	Changing

NOTE: On some models the BARO sensor is incorporated in the engine control module (ECM) and can only be checked with diagnostic equipment.

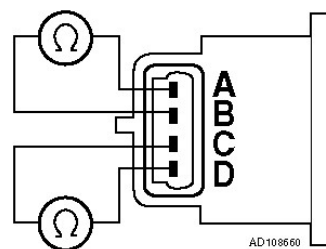
- Ensure ignition switched OFF.
- Disconnect BARO sensor multi-plug.
- Check resistance between BARO sensor terminals.
- Check resistance between BARO sensor terminals 1 and 2.
- Blow into BARO sensor port [Fig. 19](#) [A].
- Check that resistance changes.



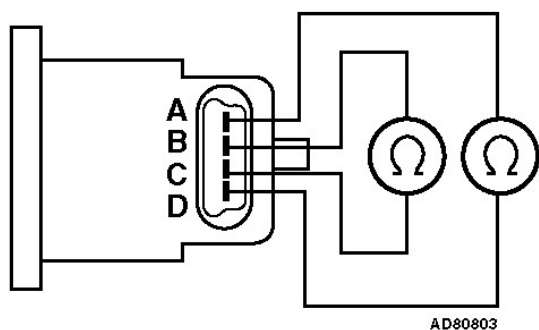
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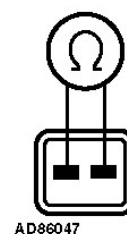
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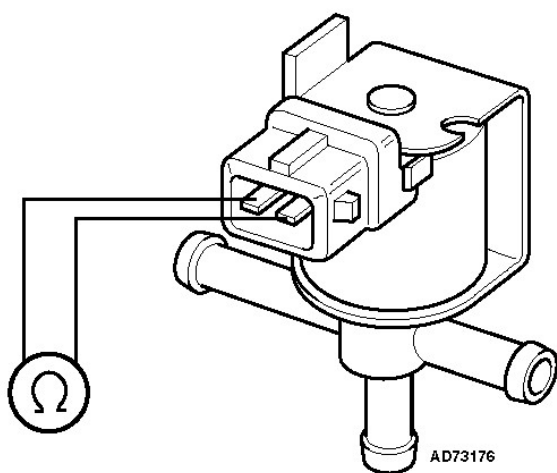
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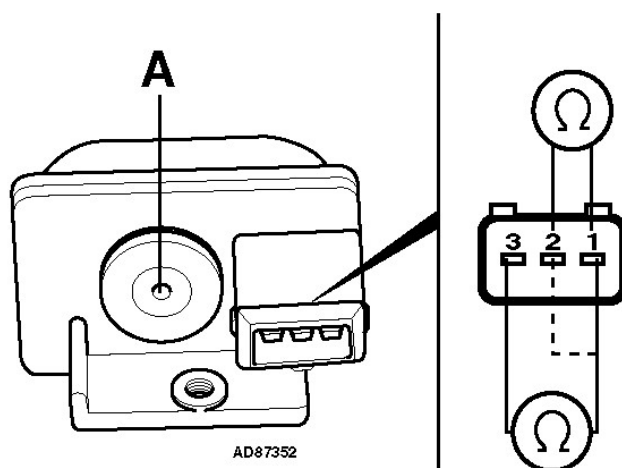
17



18



19





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System operation

- System LED location: Top of driver's and front passenger's door panel.
- When vehicle is locked LED flashes rapidly for 30 seconds, then flashes at regular intervals.
- If system LED illuminates for 30 seconds when locking vehicle: Check interior movement sensors.
- Alarm/central locking functions can be altered using diagnostic equipment.
- Some models:
 - Pressing key unlock button once deactivates system and unlocks driver's door only.
 - Pressing key unlock button twice within 5 seconds deactivates system and unlocks all doors.
 - Holding key lock button in depressed position closes windows.
 - Holding key unlock button in depressed position opens windows.
 - Interior lamps switched off when arming system.
 - Interior lamps with switch set to 'door operation' illuminate when disarming system.
- If vehicle unlocked and doors or boot not opened within 1 minute, locks are reactivated.
- Interior movement sensors deactivation switch located on driver's 'B' pillar.
- If vehicle not used for approximately 28 days, LEDs are switched OFF.

Synchronization

When

- Key buttons operated repeatedly while vehicle out of range and system becomes inoperative.
- Key batteries replaced.

How - early models

- Depress lock or unlock button.
- Manually lock and unlock driver's door within 30 seconds.
- System should now lock or unlock vehicle.
- If not, carry out programming procedure.

How - late models

- If vehicle locked, manually unlock driver's door using key.
- Press key unlock button once.
- Switch ignition ON and OFF.
- Remove key from ignition switch.
- Press key lock or unlock button once.
- System should now operate correctly.
- If not, carry out programming procedure.

Programming

When

- Key added or replaced.
- System malfunction.

How

NOTE: A maximum of 4 keys can be programmed (one at a time).

- Memory positions of existing keys can be identified using diagnostic equipment.
- If diagnostic equipment available:
 - Locate vacant memory position for new key.
 - Locate memory position of key to be replaced.
 - Carry out programming procedure for this key only.
- If diagnostic equipment not available: Obtain and reprogram all keys.

NOTE: Existing key memory positions will be overwritten.

- Switch ignition ON. Use key not fitted with remote control.
- Manually lock driver's door using key.
- Complete the following within 30 seconds:
 - Within 5 seconds press unlock button on first key once (programs memory position 1).
 - Indicators will flash once to indicate signal received.
 - Wait 5 seconds.
 - Press unlock button once to confirm programming.
 - Vehicle unlocks. Programming mode deactivated.
- Switch ignition OFF. Remove key.
- To program remaining keys into memory positions 2, 3 and 4, carry out the complete procedure below for each key:
 - Switch ignition ON. Use key not fitted with remote control.
 - Manually lock driver's door using key.
 - Within 5 seconds press unlock button at 1 second intervals, as follows:
 - Twice for memory position 2 (second key).
 - Three times for memory position 3 (third key).
 - Four times for memory position 4 (fourth key).
 - Indicators flash once every time unlock button is pressed, to indicate signal received.
 - Wait 5 seconds.
 - Press unlock button once to confirm programming.
 - Vehicle unlocks. Programming mode deactivated.
 - Switch ignition OFF. Remove key.

NOTE: Ignition MUST be switched OFF between each key programming procedure.

Memory erase procedure

When

- Lost key fitted with remote control.
- Incorrect number of keys supplied with vehicle.

How

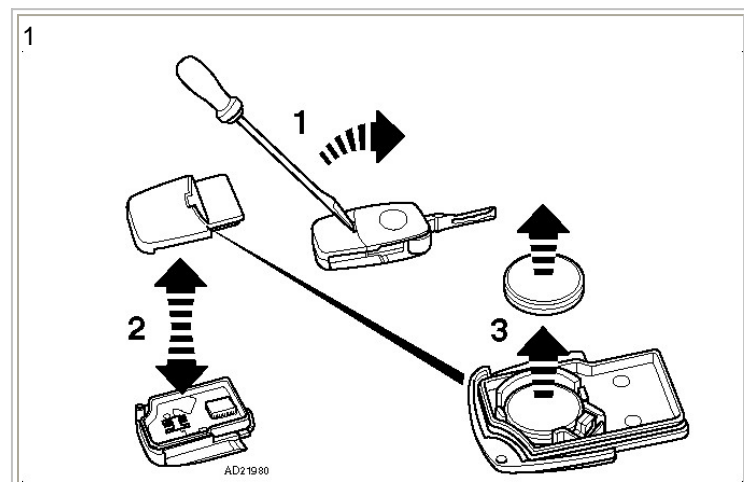
- Memory can only be erased using diagnostic equipment.



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Fig. 1





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System operation

- System arms after switching ignition OFF.
- Switch ignition ON.
- Ensure immobilizer warning lamp illuminates for approximately 3 seconds **Fig. 2**.

Programming

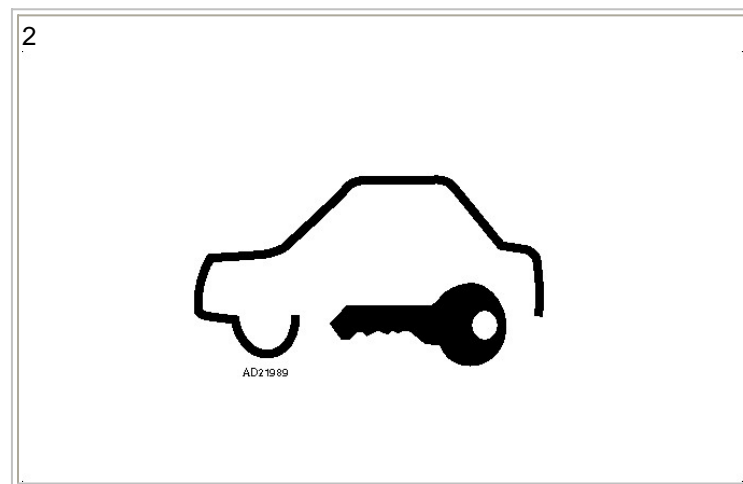
When

- Key code not recognised: Switch ignition ON. Immobilizer warning lamp flashes **Fig. 2**.
- System malfunction: Switch ignition ON. Immobilizer warning lamp flashes **Fig. 2**.
- System malfunction: Engine runs for approximately 1 second, then cuts out.
- Key added or replaced.

How

- Immobilizer can only be programmed using diagnostic equipment.
- Obtain all keys to be programmed.

NOTE: A maximum of 8 keys can be programmed.



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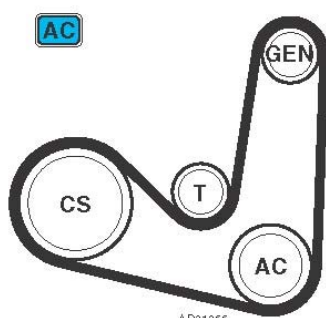
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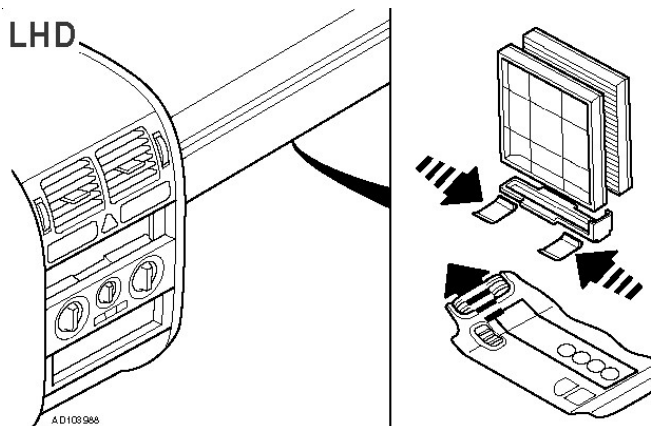
Email: mail@volkscity.com

Serpentine belt routing

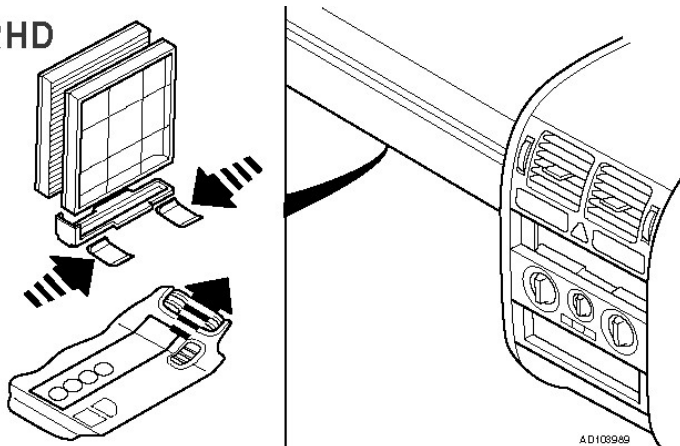


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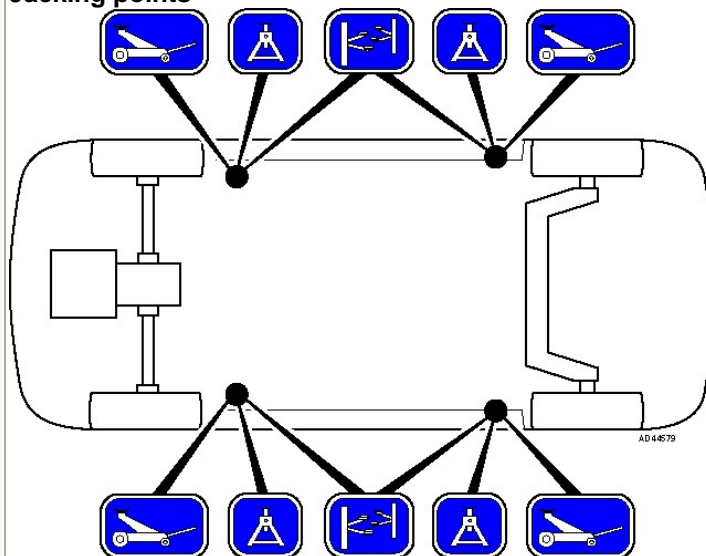
LHD



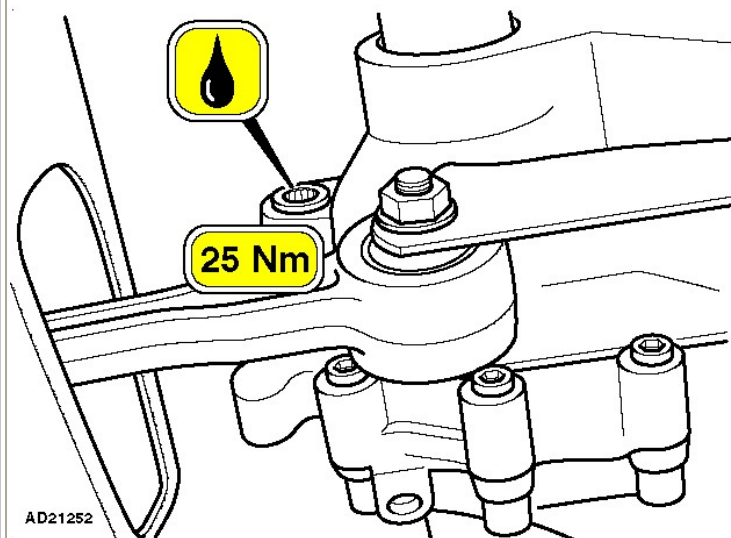
RHD



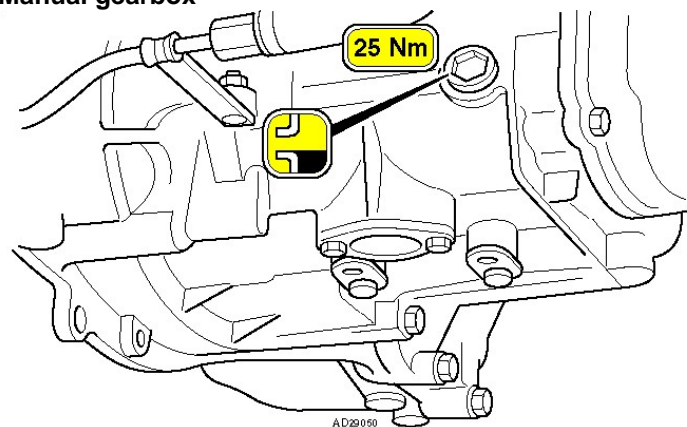
Jacking points



Manual gearbox



Manual gearbox





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Vehicles on longlife service intervals must have the service interval indicator reset using suitable diagnostic equipment.

Vehicles on fixed interval servicing can be reset as follows:

Press and hold button [A] **84764**.

Switch ignition ON.

The words "SERVICE" or "SERVICE IN xxxx MI" will appear in the trip recorder display.

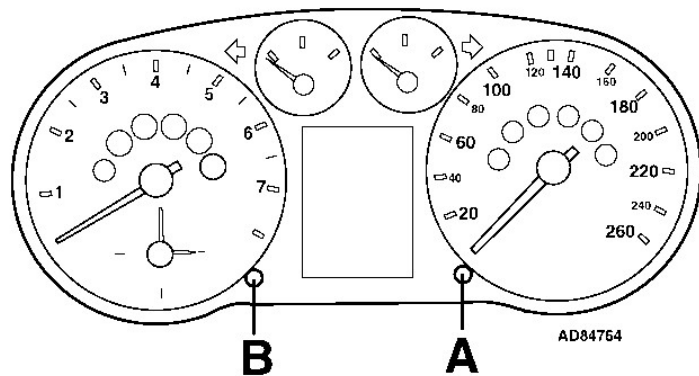
Release button [A].

Press button [B] to reset the display.

The words "SERVICE IN 10 000 MI" will appear in the trip recorder display.

Switch ignition OFF.

84764





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Notes			Specified value	Measured value
Vehicle identification				
	No. of cylinders	Type	4/DOHC	
	Capacity (Fiscal)	cc	1598	
	Compression ratio	:1	11,5	
	Suitable for unleaded petrol		Yes	
	Minimum octane rating	RON	98	
	Ignition system	Make	Bosch	
	Ignition system	Type	Motronic MED7.5.1	
	Ignition system	Description	Map-DI	
	Trigger location		Cam / Crankshaft	
	Fuel system	Make	Bosch	
	Fuel system	Type	Motronic MED7.5.1	
	Fuel system	Description	MFI-s	
	Air metering	Type	Mass	
	Combined ignition and fuel ECM		Yes	
	Diagnostic socket		Yes	
Ignition system				
	Firing order		1-3-4-2	
Tuning and emissions				
	Ignition timing - basic BTDC	°Engine/rpm	Not adjustable	
	Ignition advance checks	°Engine/rpm	ECM Controlled	
	Idle speed	rpm	600-720 Not adjustable	
	Oil temperature for CO test	°C	80	
	CO level at idle speed - tailpipe	Vol. % CO	0,5 Max Not adjustable	
	HC level at idle speed	ppm	100	
	CO2 level at idle speed	Vol. % CO2	14,5-16	
	O2 level at idle speed	Vol. % O2	0,1-0,5	
	Increased idle speed for CO test	rpm	2500-3000	
	CO content at increased idle speed	Vol. %	0,3	
	Lambda at increased idle	λ	0,97-1,03	
Spark plugs				
	Spark plugs	Original equipment	VW/Audi	
	Spark plug	Type	101000068AA	
	Electrode gap	mm	0,9-1,1	
	Spark plugs	Make	Bosch	
	Spark plug	Type	FGR6HQEO	
	Electrode gap	mm	0,9-1,1	
Service checks and adjustments				
	Valve clearance -INLET	mm	Hydraulic	
	Valve clearance -EXHAUST	mm	Hydraulic	
	Compression pressure	bar	7-15	
	Oil pressure	bar/rpm	2,0/2000	
	Radiator cap	bar	1,2-1,5	
	Thermostat opens	°C	109	
Lubricants and capacities				

Engine oil options				
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	0W/30	
275	Engine oil classification	OEM	VW 503.00	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	5W/30, 5W/40	
	Engine oil classification	OEM	VW 500.00	
	Ambient temperature range		-35°C → 15°C	
	Engine oil grade	SAE	5W/30, 5W/40	
	Engine oil classification	OEM	VW 501.01	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	5W/50	
	Engine oil classification	OEM	VW 501.01	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	10W/30, 10W/40	
	Engine oil classification	OEM	VW 500.00	
	Ambient temperature range		-20°C → 15°C	
	Engine oil grade	SAE	10W/30, 10W/40	
	Engine oil classification	OEM	VW 501.01	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	10W/50, 10W/60	
	Engine oil classification	OEM	VW 501.01	
	Ambient temperature range		-15°C → 40°C	
	Engine oil grade	SAE	15W/40, 15W/50	
	Engine oil classification	OEM	VW 501.01	
	Ambient temperature range		-15°C → 40°C	
	Engine oil grade	SAE	20W/40, 20W/50	
	Engine oil classification	OEM	VW 501.01	
	Engine with filter(s)	litres	4,5	
Other lubricants and capacities				
	Manual gearbox oil grade	SAE	75W/90 Synthetic	
	Manual gearbox oil classification		G50	
	Manual gearbox	litres	1,9	
	Cooling system	litres	5,6	
	Brake fluid	Type	DOT 4	
	Brake fluid	litres	1,0	
	Power steering fluid	Type	VW G 002 000	
	Power steering fluid	litres	0,8	
Tightening torques				
	Cylinder head instructions			
Cylinder head				
		Renew bolts	Yes	
	Stage 1	Tighten	30 Nm	
	Stage 2	Tighten	90°	
	Stage 3	Tighten	90°	
Other engine tightening torques				
	Main bearings	Renew bolts/nuts	Yes	
	Main bearings	Stage 1	25 Nm	
	Main bearings	Stage 2	65 Nm	
	Big end bearings	Renew bolts/nuts	Yes	
	Big end bearings	Stage 1	30 Nm	
	Big end bearings	Stage 2	90°	
62	Oil pump to cylinder block		12 Nm	
	Sump bolts		10 Nm	
	Sump drain bolt		30 Nm	
62	Flywheel/driveplate		60 Nm+90°	
	Clutch to flywheel		20 Nm	
62	Crankshaft pulley/damper centre bolt		90 Nm+90°	

175	Camshaft sprocket/gear			
62	Camshaft carrier/cap		10 Nm+90°	
	Inlet manifold to cylinder head		20 Nm	
62	Exhaust downpipe to manifold		40 Nm	
	Water pump		20 Nm	
	Spark plugs		30 Nm	
	Fuel rail		10 Nm	
	Camshaft position (CMP) sensor		10 Nm	
	Lambda sensor (Oxygen)		55 Nm	
	Knock sensor (KS)		20 Nm	
	Engine oil pressure switch		25 Nm	
	Oil filter		20 Nm	
Chassis tightening torques				
220	Front hub		120 Nm	
62	Rear hub		175 Nm	
62	Steering wheel		50 Nm	
62	Steering rack/box mounting		50 Nm+90°	
62	Steering track rod end		45 Nm	
	Brake disc to hub	Front	4 Nm	
	Brake caliper to carrier	Front	28 Nm	
	Brake disc to hub	Rear	4 Nm	
62	Brake caliper to carrier	Rear	35 Nm	
	Brake caliper carrier to hub	Rear	65 Nm	
62	Back plate to hub	Rear	60 Nm	
	ABS sensor	Front	8 Nm	
	ABS sensor	Rear	8 Nm	
	Road wheels		120 Nm	
Starting and charging				
	Battery	V/RC(Ah)	12	
Brake disc and drum dimensions				
	Minimum disc thickness - ventilated	Front	20 mm	
	Minimum disc thickness	Rear	7 mm	
170	Maximum drum diameter	Rear	201,5 mm	
119	Minimum pad thickness	Front	7 mm	
119	Minimum pad thickness	Rear	7,5 mm	
	Minimum shoe thickness	Rear	2,5 mm	
Air conditioning				
	Air conditioning refrigerant	Type	R134a	
219	Air conditioning refrigerant quantity	grams		
	Air conditioning oil	Type	G052 300 A2	
	Air conditioning oil quantity	cm³	180±15	
	Air conditioning oil viscosity	ISO	46	

Autodata Note 275

Engine oil classification

Longlife oil

Autodata Note 62

Use new bolts/nuts.

Autodata Note 175

Camshaft sprocket/gear

Exhaust camshaft - use new bolt and tighten to 20 Nm + 90°.

Camshaft adjuster (LH thread) - fit new packing plate and tighten to 40 Nm + 90°.

Autodata Note 220

Front hub

Use new nut.

Apply locking fluid to driveshaft splines.

Autodata Note 170

Maximum drum diameter

Aluminium drum = 181,5 mm.

Autodata Note 119

Minimum pad/shoe thickness

Measurement includes lining and pad/shoe backing plate.

Autodata Note 219

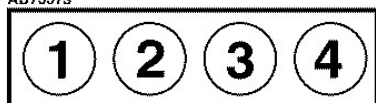
Refrigerant quantity

2000-01 = 500-550 grams

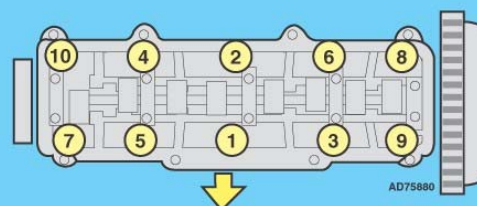
2001→ = 480-530 grams.

Cylinder layout

AD75573



Tightening sequence





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Important note

Important note

The intervals and procedures given are subject to alteration by the manufacturer at any time. Check the regularly updated Timing Belts section on our website to ensure that you are kept informed of any changes that may occur between issues of the Autodata CD.

<http://www.autodata-cd.com>

Timing belt replacement intervals

Where possible the recommended intervals have been compiled from vehicle manufacturers' information. In a few instances no recommendation has been made by the manufacturer and the decision to replace the belt must be made from the evidence of a thorough examination of the condition of the existing belt.

Apart from the visible condition of the belt, which is explained fully in the General Instructions/Toothed Timing Belts section, there are several other factors which must be considered when checking a timing belt:

1. Is the belt an original or a replacement.
2. When was the belt last replaced and was it at the correct mileage.
3. Is the service history of the vehicle known.
4. Has the vehicle been operated under arduous conditions which might warrant a shorter replacement interval.
5. Is the general condition of other components in the camshaft drive, such as the tensioner, pulleys, and other ancillary components driven by the timing belt, typically the water pump, sound enough to ensure that the life of the replacement belt will not be affected.
6. If the condition of the existing belt appears good, can you be satisfied that the belt will not fail before the next check or service is due.
7. If the belt does fail, have you considered the consequences. If the engine is an INTERFERENCE type then considerable expensive damage may well be the result.
8. The cost of replacing a belt as part of a routine service could be as little as 5 to 10% of the repair cost following a belt failure. Make sure your customer is aware of the consequences.
9. If in doubt about the condition of the belt - RENEW it.
10. Refer to the Toothed Timing Belts/Service Replacement section for further information relating to arduous or adverse operating conditions, inspection and service replacement.

Replacement Interval Guide

Replacement Interval Guide

Volkswagen recommend check at the first 90,000 kilometres (55,920 miles) and then every 30,000 kilometres (18,640 miles) (replace if necessary).

The vehicle manufacturer has not recommended a timing belt replacement interval for this engine.

NOTE: The vehicle manufacturer publishes this information only in kilometres. The conversion to miles is included for reference purposes only.

The previous use and service history of the vehicle must always be taken into account.

Check For Engine Damage

Check For Engine Damage

CAUTION: This engine has been identified as an INTERFERENCE engine in which the possibility of valve-to-piston damage in the event of a timing belt failure is **MOST LIKELY** to occur.
A compression check of all cylinders should be performed before removing the cylinder head(s).

Repair Times - hrs

Repair Times - hrs

Remove & install	3,30
------------------	------

Special Tools

Special Tools

- Auxiliary drive belt tensioner locking pin - Audi No.T10060.
- Camshaft locking tools - Audi No.T10074.
- Crankshaft pulley holding tool - Audi No.3415/1.

Special Precautions

Special Precautions

- Disconnect battery earth lead.
- DO NOT turn crankshaft or camshaft when timing belt removed.
- Remove spark plugs to ease turning engine.
- Turn engine in normal direction of rotation (unless otherwise stated).
- DO NOT turn engine via camshaft or other sprockets.
- Observe all tightening torques.

Removal - Timing Belt

Removal

1. Raise and support front of vehicle.
2. Remove:
 - Engine upper cover.
 - Plenum chamber cover.
 - Air intake duct.
 - Air intake hose between air filter and inlet manifold.
 - Engine undershield.
 - Auxiliary drive belt. Use tool No.T10060.

NOTE: Mark direction of rotation on belt with chalk if belt is to be reused.



- Air filter assembly.
- Timing belt upper cover [1] .

3. Support engine.
4. Remove:
 - RH engine mounting.

- RH engine mounting bracket.
- 5. Lower engine slightly.
- 6. Turn crankshaft clockwise to TDC on No.1 cylinder. Ensure timing marks on crankshaft pulley aligned [2] .
- 7. Ensure camshaft sprocket locating holes aligned [3] .
- 8. If locating holes not aligned: Turn crankshaft one turn clockwise.
- 9. Fit crankshaft pulley holding tool. Tool No.3415/1.
- 10. Slacken crankshaft pulley bolt [4] .
- 11. Remove:
 - Holding tool. Tool No.3415/1.
 - Crankshaft pulley bolt [4] .
 - Crankshaft pulley [5] .
- 12. Fit two washers to crankshaft pulley bolt [4] .
- 13. Fit crankshaft pulley bolt [4] . Lightly tighten bolt.
- 14. Remove:
 - Auxiliary drive belt tensioner pulley (models with AC).
 - Timing belt lower cover [6] .
- 15. Ensure timing mark aligned [7] .
NOTE: Align ground tooth on crankshaft sprocket.
- 16. Install locking tools to camshaft sprockets [8] . Tool No.T10074.
NOTE: Ensure locking tools located correctly in cylinder head.
- 17. Slacken tensioner pulley bolt [9] .
- 18. Turn tensioner pulley anti-clockwise to release tension on belt.
- 19. Remove timing belt.
NOTE: Mark direction of rotation on belt with chalk if belt is to be reused.

Installation - Timing Belt

Installation

- 1. Ensure locking tools fitted to camshaft sprockets [8] .
- 2. Ensure timing mark aligned [7] .
NOTE: Align ground tooth on crankshaft sprocket.
- 3. Remove:
 - Guide pulley bolt [10] .
 - Guide pulley [11] .
- 4. Tighten tensioner pulley bolt finger tight [9] . Ensure baseplate is supported by bolt [12] .
- 5. Fit timing belt in anti-clockwise direction, starting at water pump sprocket.
- 6. Fit:
 - Guide pulley [11] .
 - Guide pulley bolt [10] .
- 7. Tighten guide pulley bolt [10] . Tightening torque: 50 Nm.
- 8. Turn tensioner pulley clockwise [13] until pointer [14] aligned with notch [15] in baseplate.
- 9. Tighten tensioner pulley bolt to 20 Nm [9] .
- 10. Remove locking tools from camshaft sprockets [8] .
- 11. Turn crankshaft two turns clockwise to TDC on No.1 cylinder. Ensure timing mark aligned [7] .
- 12. Ensure locking tools can be inserted into camshaft sprockets [8] .
- 13. Ensure pointer [14] aligned with notch [15] in baseplate.
- 14. If not: Repeat tensioning procedure.
- 15. Apply firm thumb pressure to belt at . Pointer [14] and notch [15] in baseplate must move apart.
- 16. Release thumb pressure from belt at .
- 17. Turn crankshaft two turns clockwise to TDC on No.1 cylinder. Ensure timing mark aligned [7] .
- 18. Ensure pointer [14] aligned with notch [15] in baseplate. If not: Replace tensioner pulley.
- 19. Remove crankshaft pulley bolt [4] .
- 20. Install:
 - Timing belt lower cover [6] .
 - Crankshaft pulley [5] .
 - New oiled crankshaft pulley bolt [4] .

21. Fit crankshaft pulley holding tool. Tool No.3415/1.
22. Tighten crankshaft pulley bolt [4] . Tightening torque: 90 Nm + 90°.
23. Remove holding tool. Tool No.3415/1.
24. Install components in reverse order of removal.
25. Tighten bolts securing engine mounting bracket to engine. Tightening torque: 50 Nm.
26. Tighten engine mounting:
 - Bolts securing engine mounting to body - 20 Nm + 45° . Use new bolts.
 - Bolts securing engine mounting to engine mounting bracket - 40 Nm + 90°.

Removal - Exhaust Camshaft Drive Belt



Removal

1. Remove timing belt as described previously.
2. Slacken tensioner pulley bolt [16] .
3. Turn tensioner pulley clockwise to release tension on belt.
4. Remove:
 - Tensioner pulley bolt [16] .
 - Tensioner pulley [17] .
 - Drive belt.

NOTE: Mark direction of rotation on belt with chalk if belt is to be reused.

Installation - Exhaust Camshaft Drive Belt

Installation

1. Ensure locking tools fitted to camshaft sprockets [8] . Tool No.T10074.
2. Fit drive belt in clockwise direction, starting at top of inlet camshaft sprocket.
3. Ensure belt is taut between sprockets on non-tensioned side.
- NOTE: Observe direction of rotation marks on belt.**
4. Turn tensioner pulley clockwise until pointer in position as shown [18] .
5. Install:
 - Tensioner pulley [17] .
 - Tensioner pulley bolt [16] .
6. Tighten tensioner pulley bolt finger tight [16] .
- NOTE: Ensure lug [19] in baseplate is located in cylinder head hole.**
7. Turn tensioner anti-clockwise [20] until pointer [21] aligned with lug [19] in baseplate.
8. Tighten tensioner pulley bolt to 20 Nm [16] .
9. Fit timing belt as described previously.
10. Remove locking tools from camshaft sprockets [8] .
11. Turn crankshaft two turns clockwise to TDC on No.1 cylinder. Ensure timing mark aligned [7] .
12. Ensure locking tools can be inserted into camshaft sprockets [8] .
13. Ensure pointer [21] aligned with lug [19] in baseplate.
14. If not: Repeat tensioning procedure.
15. Apply firm thumb pressure to belt at . Pointer [21] and lug [19] in baseplate must move apart. If not: Replace tensioner pulley.
16. Release thumb pressure from belt at .
17. Turn crankshaft two turns clockwise to TDC on No.1 cylinder.
18. Ensure pointer [21] aligned with lug [19] in baseplate.
19. Install components in reverse order of removal.

